AFRICAN DEVELOPMENT BANK GROUP

MALI

MINI HYDROPOWER PLANTS AND RELATED DISTRIBUTION NETWORKS DEVELOPMENT PROJECT (PDM-Hydro)

RDGW DEPARTMENT

November 2017

Translated document

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EQUIVALENTS, WEIGHTS AND MEASURES, ACRONYMS AND ABBREVIATIONS

CURRENCY EQUIVALENTS

July 2017

UA 1 = XOF 799.76245

UA 1 = EUR 1.21923

UA 1 = USD 1.39139

Fiscal Year

1 January to 31 December

• m	meter	1 m	• kep	kilo oil equivalent	
• cm	centimetre	0,01 m	• V	volt	1 V
• mm	millimetre	0,001 m	• kV	kiloVolt	1000 V
• km	kilometre	1.000 m	• kVA	kiloVolt Ampere	1000 VA
• m^2	square meter	1 m^2	• W	Watt	1 W
• cm^2	Square centimetre	0,0001 m^2	• kW	kiloWatt	1000 W
• mm^2	Square millimetre	0,01 cm^2	• MW	Mega Watt	1000 kW
• km^2	Square kilometre	1 000 000 m^2	• GW	GigaWatt	1000 MW
• ha	hectare	10 000 m^2	• kWh	kiloWatt-hour	1000 Wh
• kg	kilogramme	1000 g	• MWh	MegaWatt-hour	1000 kWh
• t	tonne	1 000 kg	• GWh	GigaWatt-hour	1000MWh
•			•		

ACRONYMS AND ABBREVIATIONS

ADF	=	African Development Fund
AfIF/EU		African Investment Facility/European Union
APD	=	Detailed design
BD	=	Bidding Documents
CIF	=	Climate Investment Fund
CREDD	=	Economic Recovery and Sustainable Development Framework
CRP	=	Compensation and Resettlement Plan
CSP	=	Country Strategy Paper
EDM SA	=	*Energie du Mali* (Mali Power Utility)
ERR	=	Economic Rate of Return
ESIA	=	Environmental and Social Impact Assessment Study
ESMP	=	Environmental and Social Management Plan
GDP	=	Gross Domestic Product
HT	=	High Tension
IEC	=	Information, Education and Communication
IGA	=	Income Generating Activity
IRR	=	Internal Rate of Return
LV	=	Low Voltage
MDG	=	Millennium Development Goals
MT	=	Medium Tension
NEPV		Net Economic Present Value
NPV	=	Net Present Value
PCR	=	Project Completion Report
SME	=	Small and Medium-sized Enterprises
SMI	=	Small and Medium-sized Industries
SREP	=	Scaling-up Renewable Energy
TFP	=	Technical and Financial Partners
TSF		Transition Support Fund
UAC	=	Unit of Account
BOAD	=	West African Development Bank

PROJECT INFORMATION SHEET

Client Information

BORROWER/DONEE: GOVERNMENT OF MALI

EXECUTING AGENCY: ENERGIE DU MALI (EDM-SA)

Financing Plan

Sources	**Amount (UA Million)**	**Instrument**
TAF	20.00	Grant
AfIF/EU	20.03	Grant
Government of Mali	0.05	Counterpart contribution
Total Cost	**40.08**	

Key Financial Information on the Bank Grant

	TAF Grant to Mali
Grant Currency	Unit of Account (UA)
Interest Type	Non applicable
Interest Rate Margin	Non applicable
Service Charge	Non applicable
Commitment Fee	Non applicable
Maturity	Non applicable
Deferred amortization and Repayment of ADF Loans	Non applicable

Timeframe – Main Milestones (expected)

Project Approval	November 2017
Grant Effectiveness	January 2018
First Disbursement	May 2018
Last Disbursement	June 2022
Completion	December 2022

Executive Summary

1. Project Overview

1.1 The Mini Hydropower Plants and Related Distribution Networks Development Project (PDM-Hydro) is part of the Scaling up Renewable Energy Programme (SREP) approved for Mali by the Climate Investment Fund (CIF) in November 2011. Backed by several donors, SREP comprises three investment projects: (i) the SCATEC project for solar energy production (33 MWc) that the Bank approved in October 2016; (ii) the project to build mini solar PV / biofuel hybrid hydropower systems in rural areas (17.7 MWp); and (iii) this mini hydropower plants project initiated by the Bank and the European Union's African Investment Facility (AfIF/EU).

1.2. The feasibility study covered 6 sites, 2 mini power plants and 4 micro power plants. The scope of this project concerns the 2 mini hydropower plants. A subsequent phase will take the 4 micro power plant sites into account.

1.3 The PDM-Hydro project aims to contribute to the improvement of renewable power supply and enhance access to electricity in the project area. The project's overall cost is UA 40.08 million, and will be implemented over the 2018-2022 period.

1.4 The project will benefit the population and economic operators in the regional provinces of Mopti and Ségou, and will connect 12,500 households and economic operators to the network operated by *"Société Energie du Mali" EDM-SA*.

2. Needs Assessment: Mali has an installed capacity of 556.2 MW (with 183.7 MW in hydropower, including 131 MW quota on OMVS power plants in Manantali and Félou). The installed capacity on the interconnected grid is 486.2 MW. Power supply in 2016 was provided through the lease of thermal plants totalling 98 MW and an import from Côte d'Ivoire of up to 50 MW. Despite this, the current gap in electricity supply is about 150 MW and projected at 450 MW in the next 10 years, if nothing is done. This project will increase the installed capacity by 8.9 MW (renewable source) and the energy produced by 23.68 GWh/year.

3. The Bank's Value-Added: At the request of the Malian Government, the Bank was the executing agency for the CIF grant, extended to Mali to carry out the project's preparatory studies. These studies were completed in May 2017. As a result, the Bank facilitated the European Union's participation in the project financing. In addition, lessons learned by the Bank in implementing power projects in Mali, including the preparation of the SREP investment programme and the conduct of preparatory studies, have been taken into account in this project design. Thus: (i) the project implementation has been entrusted to "*Société Energie du Mali" EDM-SA*, an independently-managed company with adequate expertise for the proper execution of project activities; (ii) an international expert in procurement contracts would be recruited to support the PMU in the procurement process; and (iii) provision has been made under the project for a training and capacity building programme for stakeholders.

The project's impact areas are the Ségou and Mopti regions in central Mali. They are not yet covered by the country's interconnected electricity grid and access to electricity is almost non-existent outside the major agglomerations. The project will help to reduce regional disparities and fragility by connecting 12,500 households and economic operators to the public electricity service.

4. Knowledge Management: The SREP Investment Program, of which the project is part, was designed to promote the management and sharing of renewable energy (RE) knowledge in Mali. The knowledge and products generated by this project will promote renewable energy development in Mali and offer opportunities for replication of good practices in other countries of the sub-region. The PMU's monitoring and evaluation expert will provide a periodic report on the trend of indicators. Furthermore, reports filed by supervision missions, the engineering consultant responsible for works monitoring and the project auditor are sources from which the Bank will draw lessons on the achievement of project objectives, with a view to improving the structuring of future operations.

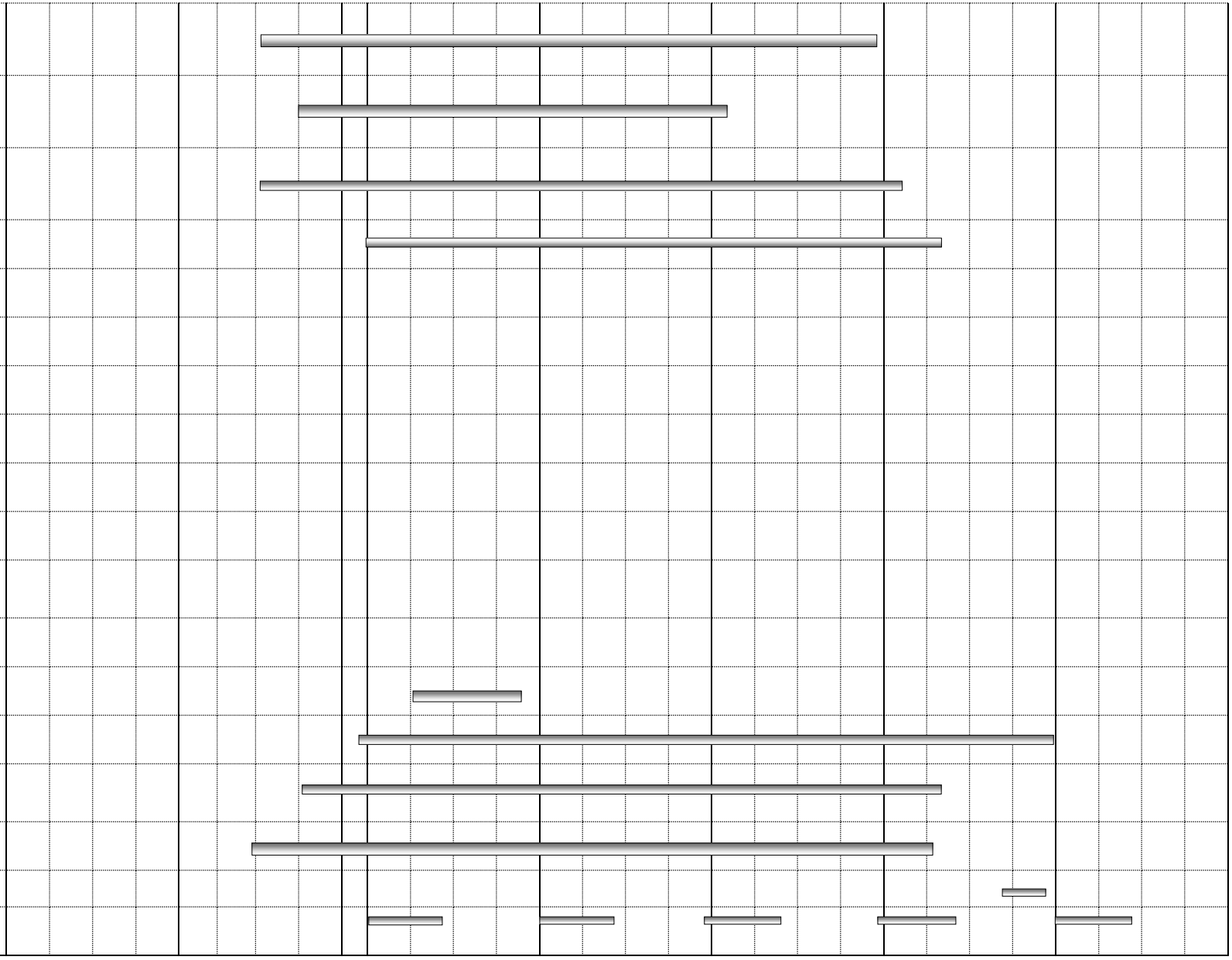
PROJECT RESULTS-BASED LOGICAL FRAMEWORK
MALI – THE MINI HYDROPOWER PLANTS AND RELATED DISTRIBUTION NETWORKS DEVELOPMENT PROJECT

Project Goal: Increase power production capacity and improve the rural population's access to modern energy services

RESULTS CHAINS			PERFORMANCE INDICATORS			MEANS OF VERIFICATION	RISKS AND MITIGATING MEASURES
			Indicators	Reference Situation (Year 2017)	Target (Year 2021)		
IMPACT	1- The population's access to electricity improved in the project area		Rate of access to electricity at national level Rate of access to electricity in rural areas	41% 25 % (in 2015)	54% 44%	**Reports:** - Ministry of Energy - EDM SA - National Institute of Statistics - EDM SA Project Implementation Unit	
OUTCOMES	1- Increased installed capacity 2- Increased number of subscribers connected to the network Reduced amount of greenhouse gases emitted in the project area **2.** Jobs created		1. Installed capacity 2. Energy mix in renewable energy 3. Number of households connected to the network 4. Amount of greenhouse gas avoided due to the hydropower plant 5. Number of temporary jobs created 6. Number of permanent jobs created	556.2 MW in 2017 38.14% - - - -	+ 8.9 MW 39.74% + 12 500 - 15 800 Teq/CO2 / year 400 (of whom 15% women) 20 (of whom 15% women)		**Risk:** Difficulty of EDM SA to maintain equipment **Mitigation Measures:** (i) EDM SA is experienced in operating and maintaining hydropower stations; (ii) EDM SA officials will be involved in the power plant equipment installation phase for better handling of operation and maintenance services after the project.
OUTPUTS	**A. Construction of infrastructure**	• Djenne and Talo mini power plants built • MV networks built • Substations built and equipped • LV networks established • Villages electrified • Connection equipment and prepaid meters supplied •Functional street lighting areas	1.1. Number of mini plants built 1.2. Length of MT network established 1.3. Number of MT/LT substations built and equipped 1.4. Length of LT networks established 1.5. Length of connecting cables supplied 1.6. Connection panel kits supplied 1.7. Number of meters supplied 1.8. Number of public lighting sets installed 1.9. Number of villages electrified	- - - - - - - - -	+ 02 231 km 55 275 km 400 km 12 500 17 500	**Reports:** - Ministry of Energy - EDM SA - EDM SA Project Implementation Unit - Consulting Engineer in charge of project supervision	**Risk** (i) Delay in compensating project-affected persons (PAP) could impede the completion of works on the network. (ii) Insecurity in the project area. **Mitigation Measures** Mali has undertaken to include in each annual budget the cost of activities financed by its counterpart contribution, including resources for PAP compensation. Measures to protect the population and economic activities have been taken, with the presence of the forces of the United Nations Integrated Mission for Stabilization in Mali (MINUSMA) in the project area.
	B. Institution building	• Electricity sub-sector executives trained • Priority project studies undertaken	2.1. Number of executives trained 2.2. Number of studies carried out 2.3. Number of platforms equipped 2.4 Number of women trained in IGA 2.5. Number of gender-sensitive MCE-IEC campaigns carried out	- - - -	8 000 55 10 of whom 100% PMU women 1 10		
	C. Project management	• Supervision of works carried out • MCE-IE campaign undertaken • Accounts audit carried out • Interns trained for employment assistance	3.2. Number of audits carried out 3.3. Number of interns trained	- -	300 1 3 20 (50% women)		
MAIN ACTIVITIES BY COMPONENT	**A. Construction of hydropower stations and related distribution networks:** (i) Establish hydropower plants; (ii) establish MV networks and MV/LV transformers; (iii) build LV networks and put up streetlights for public lighting; (iv) provide connection equipment and meters; and; (v) implement and monitor the ESMP. **B. Institution building:** (i) Conduct an electrification study of 60 rural localities with hybrid PV/diesel thermal sources; (ii) Conduct a hydropower power plant development study; (iii) Train executives of the electrical sub-sector **C. Project management:** (i) works control and supervision; (ii) energy management campaign, Information, Education and Communication (ME-IEC); (iii) contribute to the operating costs of the PMU; (iv) audit project accounts.					**Resources** TAF Grant : UA 20.0 million European Union : UA 20.03 million Government : UA 0.05 million **Application** Component 1 : UA 35.60 million Component 2 : UA 1.27 million Component 3 : UA 3.21 million	

Project Implementation Schedule

Activity Description	2017				2018					2019				2020				2021				2022				2023			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Approval and Effectiveness																													
2. Board Approval																													
3. Signing of Grant Protocol Agreement																													
4. General Information Note (GINA)																													
5. Effectiveness																													
6. Project Launch																													
7. Fulfillment of Conditions for 1st Disbursement																													
8. Construction of Infrastructure																													
9. Control and Supervision: Recruitment Process																													
10. Control and Supervision: Services																													
11. Construction of Power Plants: Procurement																													
12. Construction of Power Plants: Works																													
13. Construction of related Networks: Procurement																													
14. Construction of related Networks: Works																													
15. Institutional Support																													

16. Electrification Study of 60 Communities: Recruitment Process	
17. Electrification Study of 60 Communities: Services	
18. Multifunctional Platform: Protocol Agreement	
19. Multifunctional Platform: Services	
20. UGP Training	
21. Project Management	
22. Account Audits: Recruitment Processes	
23. Account Audits: Services	
24. IEC Campaign: Protocol Agreement	
25. IEC Campaign: Services	
26. Evaluation Monitoring	
27. Definition of Reference Indicators	
28. Definition of end of Project Indicators	
29. Supervision Mission	
30. Project Completion	
31. Closure of Project Account	
32. Donor PCR	
33. Mission completion and Report	

REPORT AND RECOMMENDATION OF BANK GROUP MANAGEMENT TO THE BOARD OF DIRECTORS CONCERNING THE MINI HYDROPOWER PLANTS AND RELATED DISTRIBUTION NETWORKS DEVELOPMENT PROJECT (PDM-Hydro)

Management hereby submits this report and recommendations concerning a proposal to award a UA 20 million TAF grant to the Government of the Republic of Mali to finance the PDM-Hydro Project.

I. STRATEGIC THRUST AND RATIONALE

1.1 Project Linkages with Country Strategy and Objectives

1.1.1 The project will increase the installed capacity of Mali's electricity system with a renewable energy source and promote the population's access to quality energy services. It is part of the first pillar of Mali's Economic Recovery and Sustainable Development Strategic Framework (CREDD 2016-2018). The CREDD 2016-2018 focuses on three strategic areas: (a) inclusive and sustainable economic growth encompassing infrastructure development; (b) access to basic social services; and (c) institution building and governance. The project is in line with the National Strategy for the Development of Renewable Energies, dating back to 2006, which aims to enhance the share of renewable energies in the national electricity production.

Furthermore, the project is fully consistent with the two pillars of the Bank's 2015-2019 CSP, i.e.: (i) improved governance for inclusive growth; and (ii) infrastructure development in support of economic recovery. Pillar 1 includes support for the development of growth-oriented companies such as *"Société Energie du Mali" EDM-SA*, since energy is an essential input for the industrial sector, whereas pillar 2 concerns infrastructure to be developed under the project. The project is also aligned on the Bank's 2013-2022 Ten-Year Strategy, which focuses on five operational priorities, including "infrastructure development". It is also consistent with two of the Bank's five key strategic priorities (High 5s): "*Light up and Power Africa*," which aims to achieve universal access to energy by 2025; and "*Improve the quality of life for the people of Africa"*.

Lastly, the project concords with: (i) one of the objectives of the Bank's energy sector policy, which consists in "supporting the efforts of regional member countries to provide all their population and production sectors access to modern, reliable and affordable energy services"; and (ii) Pillar II of the Bank's 2014-2018 gender strategy as regards women's economic empowerment.

1.2 Rationale for Bank's Involvement

1.2.1 Mali's national electricity access rate is estimated at 41%, while energy demand is growing at a sustained rate of about 10% yearly. The current power generation capacity deficit is 150 MW. The price for electricity supplied by small private companies to rural dwellers is 3 to 4 times higher than that paid by customers supplied by the interconnected grid, because of the lack of price control in the area not covered by *Energie du Mali (EDM-SA).* This raises issues regarding economic competitiveness and access to modern energy services. The Bank's involvement will facilitate the connection of 12,500 households and economic operators to the interconnected grid, and provide them a much more affordable kWh price (an average of CFAF 97/kWh instead of CFAF 300 F/kWh).

The Bank has been the TFP leader for the energy sector in Mali in recent years, and has led the dialogue with the Government for the preparation of Mali's SREP Investment Programme (IP), with the undertaking to assist in preparing, co-financing and implementing the various projects contained in the Programme. At the request of the Malian Government, the Bank was the executing agency for the CIF grant to Mali, awarded to carry out preparatory studies for the project. The Bank's involvement in the implementation stage would enable Mali to take advantage of the studies provided to consolidate its power generation infrastructure. Being in line with the IP objectives, the project will promote the development of renewable energy in Mali, and open opportunities for replication of good practices in countries of the sub-region.

The sites chosen for the mini-power plants (Talo and Djenné) already have irrigation infrastructure, including hydraulic dams, built as part of other projects financed by the Bank. This adds value to and is a continuation of the Bank's intervention. With an annual output of around 23.68 GWh, the project will prevent the emission of greenhouse gases with an estimated equivalent volume of 15,800 tonnes of CO2 per year.

Meeting social needs contributes to the country's cohesion and stability, development of individuals and the collective prosperity of communities. The PDM-Hydro is a public service project that will make a fundamental contribution to socio-political adjustments and the scaling down of Mali's economic fragility, with the access of 12,500 households and economic operators to electricity.

The Bank will strengthen inclusive growth in Mali by enabling 20 young graduates (50% of whom are women) to strengthen their skills for employment and 300 women to acquire management skills for income-generating activities.

Finally, the Bank's level of commitment to financing the project, reflected in the volume of TAF concessional resources awarded, would help to strengthen project performance.

1.3 Aid Coordination

1.3.1 Technical and financial partners (TFP) in Mali have structured consultation and coordination mechanisms at two levels: (i) at the political level, thanks to the Collective of Ambassadors and Heads of Agencies, under the leadership of a troika comprising three TFPs (leader, outgoing leader and future leader); and (ii) at the technical level, through sector and thematic working groups including the civil society. Despite the crisis situation, the aid coordination mechanism has remained functional and all TFPs are once again involved in the country dialogue after its suspensions following the 22 March 2012 military coup. The Bank was the head of the "Energy" thematic group between 2009 and 2013. This framework facilitates exchanges on the activities of each partner in order to create synergies between their respective interventions, thereby avoiding duplication of efforts.

1.3.2 Besides the Bank, other main technical and financial partners have intervened in the electricity sub-sector in Mali in recent years, including: AFD, WB, BOAD, IsDB, IFC, Republic of Morocco, India (Exim Bank) and China (Exim Bank). AFD is currently the leader of the "Energy" thematic group. The financing of these TFPs covers all segments of activity (production, transport, distribution) and technical assistance.

1.3.3 With regard to this project, the Bank approached PTFs active in Mali to participate in financing activities under the project. The European Union agreed to participate through co-financing and the Bank will manage the resources provided.

Table 1.3.
Volume of Donor Interventions in the Electricity Sub-sector in Mali

Electricity sub-sector	Magnitude		
	GDP	Exports	Labour
	0.3%	0%	1%
Stakeholders – Annual Public Expenditure (2012-2016)			
Government	Donors		
MALI - 139.6 UAM (29 %)	336.7 (71 %)	*ADF (6.01 %), IDA (5.74 %), Eximbank China (65.58 %), other donors (22.67 %)*	
Level of aid coordination			

	MALI
Existence of thematic working groups in the sub-sector	Yes
Existence of a global sector programme	No
AfDB's role in aid coordination	Member

II. PROJECT DESCRIPTION

2.1 Project Components

2.1.1 The project's development objective is to enhance Mali's installed power capacity and to improve households' access to electricity. The specific objectives of the project are to: (i) increase the national power generation capacity by 8.9 MW; (ii) connect 12,500 new electricity subscribers in rural areas; (iii) reduce greenhouse gas emission by 15,800 tCO2/annum by reducing generator usage time and; (iv) provide technical assistance for a feasibility study of the electrification project for 60 rural localities.

Table 2.1
Project Components (in UA million)

N°	Name of Components	Estimated Cost	Description of Components
A	Construction of infrastructure	35.60	(i) Construction of the Djénné and Talo power stations; (ii) construction of MV/LV distribution networks, including public lighting and the purchase of prepaid meters; and (iii) measures to mitigate project environmental and social impacts.
B	Institution building	1.27	(i) Capacity building (training) of players in the electricity sub-sector in Mali (in project planning and management); (ii) conduct feasibility as well as environmental and social impact studies of some priority projects for the preparation of future Bank interventions in Mali; (iii) equip multifunctional platforms for women in the project area.
C	Project management		(i)Audit of project accounts; (ii) recruitment of the consulting engineer for

		3.21	works control and supervision; (iii) energy management campaign, Information Education and Communication; (iv) purchase of vehicles; and (v) operation of the PMU
TOTAL PROJECT COST		40.08	

2.2 *Technical Solutions Retained and Alternatives Explored*

2.2.1 The technical solution retained consists in the construction of two mini hydropower plants of 7.5 MW (Djenné) and 1.4 MW (Talo) over water, in the Mopti and Ségou regions. Medium and low voltage distribution networks will be suspended in the air, using transformer substation a-top poles. This solution meets international standards and is suitable for rural areas where population density is low.

2.2.2 The project will provide 17,500 meters and connection equipment for 12,500 customers. *Energie du Mali (EDM-SA)* will be responsible for connections as and when requested by customers.

2.2.3 The alternatives explored and reasons for their rejection are indicated in the table below:

Table 2.2
Alternatives Explored and Reasons for Rejection

Alternatives	Brief Description	Reasons for Rejection
Diesel power stations	Installation of diesel units by AMADER licensees	• Unregulated operating field with kWh prices 2.5 to 3 times higher than those charged by EDM • High operating costs • Adverse environmental impacts
Solar photovoltaic power stations	Installation of solar panels for electricity generation	• As water retention dams have already been built at the Djenné and Talo sites, the installation of hydropower plants on these sites is more economical and the energy is also renewable.
Construction of rural networks using cabins	100% of MV/LV transformer stations in low cabins	• Low density of populations served • More costly investment
Construction of underground MV/LV networks	Installation of underground medium voltage distribution cables	• More expensive investment • Costly maintenance • Currently dispensable in the project area

2.3 *Project Type*

2.3.1 The project is a standalone investment operation that will be financed from a TAF grant, a European Union grant and the Malian national budget. The option of parallel financing of project activities was preferred to avoid difficulties that might arise from incompatibilities of procurement rules and procedures of the various donors.

2.4 *Project Cost and Financing Arrangements*

2.4.1 The overall project cost, net of taxes and customs duties, is estimated at UA 40.08 million. This includes a 5% provision for physical and technical contingencies, and a 5% provision for price escalation. It will be financed by the TAF to the tune of UA 20 million. Project costs by component, sources of financing and expenditure category are presented in Tables 2.3, 2.4 and 2.5 below:

Table 2.3
Estimated Cost by Component

Components	UA Million			% Foreign Exchange
	Foreign Exchange	Local Currency	Total	
Construction of Infrastructure	29.09	3.27	32.36	90%
Institution Building	0.80	0.34	1.15	70%
Project Management	2.05	0.88	2.92	70%
Base Cost	**31.94**	**4.50**	**36.43**	88%
Provision for Physical Contingencies	1.60	0.22	1.82	88%
Provision for Price Escalation	1.60	0.22	1.82	88%
Total Project Cost	**35.13**	**4.94**	**40.08**	88%

2.4.2 The project is co-financed by the European Union for UA 20.03 million (or EUR 24.42 million) and by the Malian Government for UA 0.05 million. The Bank will finance the costs of institution building, project management and, in part, infrastructure. The activities to be financed by the European Union include developing and equipping the Djenné power station and part of the associated distribution network. The Government of Mali will finance the project's environmental and social impact mitigation measures. Justifications for Mali's low participation are detailed in Chapter C.1 of the Technical Annex. The Bank's funding consists of a grant from the resources of the Technical Assistance Fund (TAF) under ADF 14.

Table 2.4
Project Sources of Financing

Sources of Financing	UA Million			% Total
	Foreign Exchange	Local Currency	Total	
TAF	17.10	2.90	**20.00**	50%
European Union	18.03	2.00	**20.03**	50%
Government	0.001	0.05	**0.05**	0,125%
Total Project Cost	**35.13**	**4.94**	**40.08**	100%

2.4.3 The project cost by expenditure category is as follows:

Table 2.5.1 Project Cost by Expenditure Category				
Expenditure Categories	**UA Million**			**% Foreign Currency**
	Foreign Exchange	**Local Currency**	**Total**	
Works	29.09	3.27	32.36	90%
Goods	0.07	0.03	0.10	70%
Services	2.11	0.90	3.01	70%
Operation	0.68	0.29	0.97	70%
Total Base Cost	**31.94**	**4.50**	**36.43**	**88%**
Provision for Physical Contingencies	1.60	0.22	1.82	88%
Provision Price Escalation	1.60	0.22	1.82	88%
Total Project Cost	**35.13**	**4.94**	**40.08**	**88%**

2.4.4 The expenditure schedule by project component is as follows:

Table 2.6 Expenditure Schedule by Component						
Components	**UA Million**					
	2 018	**2 019**	**2 020**	**2 021**	**2022**	**Total**
Construction of Infrastructure	7.12	10.68	10.68	7.12	0.00	35.60
Institution Building	0.25	0.38	0.63	0.00	0.00	1.26
Project Management	0.78	0.80	0.80	0.80	0.02	3.22
Total	**8.16**	**11.86**	**12.12**	**7.92**	**0.02**	**40.08**
% Total	**20.35%**	**29.6%**	**30.2%**	**19.8%**	**0.05**	**100%**

2.4.5 The TAF resources will be used to finance in part the "Infrastructure Construction"[1] and "Project Management" components. They will fully fund the “Institution Building” component. The TAF grant will also finance the "Works" category to the tune of UA 15.52 million and almost entirely, the other expenditure categories. These resources are broken down by expenditure categories as follows:

Table 2.7 Project Cost by Expenditure Categories of TSF Resources				
Expenditure Categories	**UA Million**			**% Foreign Exchange**
	Foreign Exchange	**Local Currency**	**Total**	
Works	13.68	1.84	15.52	88
Goods	0.08	0.03	0.11	70
Services	2.32	0.99	3.31	70
Operation	0.74	0.32	1.06	70
Total	**16.82**	**3.18**	**20.00**	**88.00**

2.4.6 The European Union grant will be used to fully finance the Djenné power plant

[1] Works financed by the TSF concern: the Talo station; 170 km of MT networks; 190 km of LT networks; equipment for 12,500 connections, 17,500 meters; 38 suspended sub-stations; 5,500 public lighting sets as well as environmental and social mitigation measures for the Talo station.

construction works and part of the Djenné distribution network under a separate allocation. These resources are broken down by expenditure categories as follows:

Table 2.8
Project Cost by AFIF/EU Resource Expenditure Categories

Expenditure Categories	UA Million			% Foreign Exchange
	Foreign Exchange	Local Currency	Total	
Works	14.02	6.01	20.03	70
Total	**14.02**	**6.01**	**20.03**	**70**

2.5 Project Area and Beneficiaries

2.5.1 The project impact area (see Appendix IV) is shared between two regions, Segou and Mopti, and includes 4 "*cercles*" (second-level administrative units) (Djenné, Tominian, Bla and San) and 14 "*communes*" (third-level administrative units) (Fakala, Madiama, Djenné in Djenné *cercle*, Ouan in *cercle* Tominian, Bla, Fani, Kulandougou, Yangasso in Bla *cercle*, San, Dieli, Djeguena, N'goa, N'torosso and Niasso in San *cercle*). The population of these 14 *communes* is around 521,800 inhabitants, 50.71% of whom are women. Energy generation and distribution infrastructure will benefit *Energie du Mali (EDM-SA)*, which will be in charge of operating them. The project will be of benefit to the 14 municipalities and 55 localities in particular, and will improve the living conditions of the populace who will have access to electricity. The project will enable 5,200 households in Djenné and 7300 in Talo to subscribe to electricity. The availability of electricity in the localities will facilitate new job-creating activities in agri-food processing, new information and communication technologies, carpentry, maintenance and services.

Work execution during project implementation will enable about 400 people, of which 15% women/girls, to have decent jobs. In terms of socio-professional integration, at least 20 young graduates, 50% of them girls, will be able to do internships, thereby increasing their chances of gaining employment.

2.6 Participatory Process for Project Identification, Design and Implementation

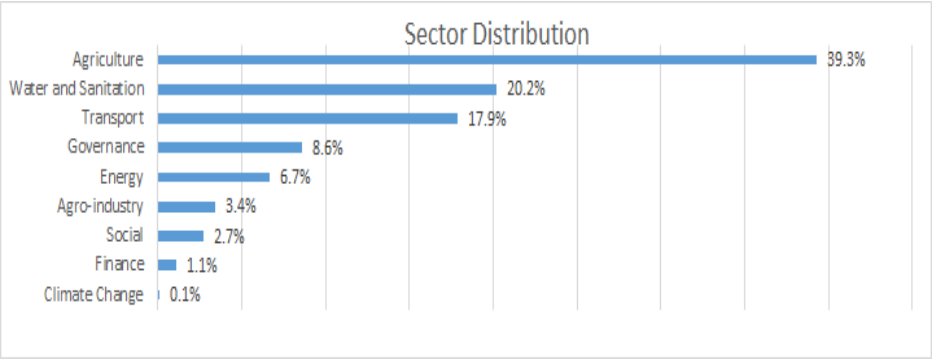
2.6.1 The SREP Investment Programme from which the project emanated, was developed by the Ministry of Energy in consultation with the structures involved in its implementation (AMADER, DNE, EDM-SA, Ministries in charge of finance, planning, the environment, local communities and water resources). During preparation of the Mali SREP Investment Programme, several missions were undertaken during which public consultation workshops involving government authorities, the private sector, NGOs, and technical and financial partners were organized. Women beneficiaries, the Ministry for Women Affairs, women entrepreneurs and women's civil society organizations were also consulted and their proposals taken into account in the project design.

2.6.2 In preparing the Environmental and Social Impact Assessment (ESIA) and the Abridged Resettlement Plan (ARP), public consultations were held both in Djenné and Talo with the regional and municipal authorities as well as village chieftains, to record their expectations regarding the valuation of various types of assets. The consultations took place in May and October 2016, in Dialobo, San, Bangassi, Konanssiadougou, Koundaraka, Ouan, Bourasso, Konio and Kombaga localities. Furthermore, communities of localities crossed and served were consulted on their fears, expectations and wishes regarding the projects. Finally, there was a survey of the affected people to update them, identify affected property and set out conditions for compensation.

2.6.3 This participatory approach will be maintained and strengthened during project implementation phase, in close collaboration with project impacted communities, local authorities, and authorities of decentralized and devolved institutions. The population will also be enlightened on electricity-related risks, energy consumption management and HIV/AIDS transmission risks.

2.7 Bank Group Experience and Lessons Reflected in Project Design

2.7.1 The Bank's portfolio in Mali as at 30 September 2017 comprises 21 operations for a total amount of approximately UA 396.9 million (CFAF 311.2 billion). The overall cumulative disbursement rate is about 30% for a portfolio with an average age of two years and 10 months. The portfolio comprises: (i) ten investment projects; (ii) a budget support; (iii) a line of credit to *Banque Malienne de Solidarité* (BMS) (iv) two project studies; (v) two institution building operations; and (vi) four capacity building operations to state agencies or associations.



In terms of sector distribution, the rural development sector (agriculture, agro-industry) comes first with nearly 42% of the total amount approved. The average size of investment operations is UA 35.2 million.

The Bank is supporting Mali for greater economic integration in West Africa with two regional operations (28% of the portfolio): (i) road with Côte d'Ivoire; and (ii) food security with seven other Sahelian countries. In addition, a power interconnection project between Mali and Guinea is being prepared and will be approved in November 2017.

The major challenges to improving the Bank's portfolio in Mali are: (i) the insecurity issue that negatively impacts the implementation of operations in Northern and Central Mali. In addition, a substantial part of the State's financial resources are absorbed by the consequences of insecurity; (ii) inadequate capacity of sector departments to formulate, prepare and oversee strategic projects; (iii) an inadequate skills match within project coordination teams, which does not facilitate the drafting of quality documents; (iv) administrative and bureaucratic delays that slow down project implementation; (v) an irregular and inadequate administrative control and sanctions system to ensure high probity in project management; and (vi) irregular involvement of civil society organizations to ensure that compensations are actually paid to those concerned and on time.

2.7.2 Current Bank operations in Mali's energy sector include (i) PAPERM (project to support the promotion of renewable energies in Mali); (ii) the feasibility study of the mini and micro hydropower plants completed in May 2017; and (iii) SCATEC (solar energy project in Segou). Regarding the SCATEC project, after approval by the Bank's Board of Directors in October 2016, the SFI lead arranger took 8 months to get the project approved, with financial terms different from the original agreement endorsed by AfDB. The Bank is reviewing these changes and shall submit the proposed modifications to the Board of Directors in November 2017.

2.7.3 Review of the implementation reports of the SREP Investment Programme, PAPERM and the Mini and Micro Power Plants Study as well as reports from the bimonthly portfolio reviews throughout 2017, indicate that there are still major challenges to be met, especially: (i) inadequate capacity of sector departments to design, prepare and assume project management functions; (ii) administrative and bureaucratic delays that slow down project implementation, including procurement; (iii) the inadequacy of resources allocated by the State to project management units for activity monitoring and supervision in the field.

2.7.4 The project design took into account lessons learned from the Bank's experience in Mali and rural projects implemented in other countries with similar conditions, particularly: (i) availability of environmental and social studies, engineering studies and equipment cost estimates based on unit prices from recent international tenders; (ii) involvement of the various public structures concerned with project preparation and the subsequent monitoring of its implementation; (iii) procurement and installation of equipment through international competitive bidding; (iv) coverage of the equipment procurement and installation cost by the project; (v) provision of the Project Management Unit (PMU) with adequate logistics, computer and office equipment for better management of project activities; (vi) recruitment of an engineering consulting firm for works control and supervision, including contract monitoring; (vii) recruitment of procurement and financial management experts exclusively dedicated to project activities; (viii) conduct of a feasibility study on a priority project in Mali's energy sector with a view to facilitating future Bank operations; (ix) PMU staff capacity building (by internationally recruited experts) on the Bank's procurement and financial management rules and procedures; (x) appointment of key members of the PMU prior to project approval; and (xi) use of advance contracting to save time on procurement.

2.8 Key Performance Indicators

2.8.1 The project's key performance indicators are detailed in the results-based logical framework matrix. The main output indicators are: (i) the number of mini-power plants built; (ii) the length of MV networks built; (iii) the number of MT/LV substations built and equipped; (iv) the length of LV networks built; (v) the length of feeder cable provided; (vi) the number of feeder switchboard kits provided; (vii) the number of meters supplied; (viii) the number of public lighting points installed; and (ix) the number of villages electrified. The main impact indicators are the number of households connected to the grid and the installed capacity, while the impact indicator is the rate of access to electricity on project completion by 2021.

2.8.2 Data on the indicators will be provided in the consulting engineer's reports, the PMU supervision reports, periodic progress reports, *Energie du Mali (EDM-SA)* activity reports and the project completion report. These data will be collected and analyzed by the monitoring and evaluation officer, who will also conduct beneficiary surveys. Furthermore, he/she will collect information from the Ministry of Energy and the administrative authorities in the project area. All these pieces of information will be recorded in periodic reports to be prepared by the monitoring and evaluation officer and communicated to the Bank. Through analysis of the indicator trend, project performance will be measured and necessary adjustments made.

III. PROJECT FEASIBILITY

3.1 Economic and Financial Performance

Table 3.1 **Project Key Economic and Financial Data**		
Basic scenario	ERR 18.4%	NEPV 19 941 M CFAF

3.1.1 **Project Economic performance:** Project economic performance was analyzed based on the economic rate of return (ERR) derived from a comparison of the updated costs (investment and operation of the electrical systems) in a "no project" situation corresponding to the use of generators to meet demand, and a "project" situation. The economic costs used for calculating the economic rate of return (ERR) and the net economic present value (NEPV) are project costs net of taxes, excluding provisions for price escalations, adjusted for the appropriate conversion factors for equipment, works, services and labour. Maintenance and other operating expenses were processed in the same manner. This comparative analysis has shown that the project has a significant economic return compared to the "no project" alternative, and is therefore the least expensive solution (see Technical Annex Table B.7).

3.1.2 **Project Financial Performance:** Project impact analysis was limited to the economic impact. A financial analysis of the project based on tariffs currently in force in Mali, would lead to the conclusion that the project is not financially viable. The current average tariffs of *Energie du Mali (EDM-SA)* do not cover the average cost of the kWh of electricity generated by mini hydropower plants, and supplied in rural areas through an extensive distribution network. The argument in favour of building mini-power plants even though there is no immediate financial gain with the current tariff is that the project will facilitate the connection of several households in rural areas and end the use of small generators in some areas – all of which would improve the current financial situation of *Energie du Mali (EDM-SA).*

3.1.3 ***Sensitivity of Project Performance:*** This was analysed in relation to: (i) a 10% increase in investment costs; and (ii) a 10% decrease in energy produced. The analysis showed that the rate of return, although sensitive to the variation of these indicators, remains above the economic cost of capital estimated at 10% in the country, thus confirming the economic viability of the project (for details, see Annex B.7).

3.2 Environmental and Social Impact

3.2.1 Environment

The Djenné and Talo mini-hydropower project is classified under environmental and social category 2. In its design, it incorporated two ESIA/ESMPs and an Abbreviated Resettlement Plan (ARP) for project-affected persons. The power plants are added to the existing Djenné and Talo dams at sites already impacted from an environmental point of view by the Bani and Sélingué Basin Irrigation Development Programme (PDI-BS). The distribution lines are deployed along the existing RN34, RN6 and RR public road easements without significant expropriation of built-up residential property or economic displacement. The ESIA/ESMPs and ARP reports have been validated at the national level and by the Bank. The ESMP and ARP summaries were posted on the Bank's website on 03/10/2017.

3.2.1.1 Negative Impacts

The anticipated negative impacts of building mini-power stations associated with distribution lines are minor overall. Their implementation will mainly generate construction waste and will stand the risk of polluting the Bani River. Concerning the deployment of distribution lines, the most significant impacts are related to the loss of vegetation and soils due to works reallocation. The project has a negative impact on the environment through: (i) the disruption of human activities; (ii) the disruption of traffic and some access, (iii) the possible displacement of networks; (iv) tree felling and pruning; and (v) the temporary occupation of land by base camps as well as deposit of building and construction materials.

The impact on the social environment will concern: (i) the increased vulnerability of certain categories of locals; (ii) the non-preservation of places of worship or heritage sites; (iii) an interface management risk between the PDI-BS (irrigation) project and the PDM-Hydropower project; and (iv) obstruction of pedestrian traffic. Moreover, the influx of people from neighbouring districts in search of jobs may disrupt the socio-cultural balance among the local populations. Site staff could also adopt behaviours that may desecrate beliefs and customs, or increase the risk of spreading STIs and HIV/AIDS.

During the operations phase, the risks will be limited to electricity-related accidents involving the local population (restrict the planting of fruit trees under power lines).

3.2.1.2 Positive Impacts

The project will have socio-economic benefits: (i) opportunities for 400 direct and decent jobs on construction sites; and (ii) indirect jobs related to the development of certain commercial activities around workers' camps (sale of agricultural and artisanal products, catering). During operation, the electricity supply will benefit rural areas and contribute to an improvement in the quality of life of 12,500 households.

More specifically, the project's crosscutting impacts on economic and social development include: (i) the creation of a conducive environment for the development of new income-generating activities, thanks in particular to public lighting that will help to lengthen working hours (opening of cafés and restaurants, sale of frozen products, opening of hairdressing salons and welding workshops, etc.); (ii) improvement in the quality of public services, especially health and education; (iii) better security for people and property; (iv) better access to information technology and entertainment.

3.2.1.3 Environmental and Social Management Programme

The measures recommended to mitigate and compensate for negative impacts are the subject of an ESMP. The related costs amount to CFAF 351.5 million, or nearly EUR 535,000. It represents nearly 1.10% of the project cost. The environmental and social analysis, together with the management matrix, are presented in Appendix B8.

Through the PMU, *Energie de Mali (EDM-SA)* will monitor the ESMP implementation. The PMU has an environmentalist and a socio-economist on its staff. They will be supported by the environmentalist in the Consulting Engineering firm (control mission), who is the delegated project manager charged with monitoring.

3.2.2 Climate Change

3.2.2.1 The project is classified under climate category 2. The climate risk assessment takes account of the 6 mini and micro power plants planned under the SREP Programme. This first phase only concerns the 2 mini power stations (Djenné and Talo), and retains the same classification with less risk given the fact that the project dams already exist. The erosions of the banks observed at the Talo dam are addressed under the PDI-BS project, which incorporates protection measures using heavy rocks, for resilience.

3.2.2.2 In terms of mitigation, the compensatory reforestation plan against deforestation ensures a net positive gain over what would be destroyed. This surplus will contribute to carbon sequestration. In addition, with regard to GHG emissions assessment, the energy production of the Djenné hydropower plant is approximately 17.75 GWh/year, thus helping to avoid nearly 11,900 tCO2/year, compared to thermal production (diesel). The Talo hydropower station will generate 5.93 GWh/year, which corresponds to approximately 3,900 tCO2 avoided per year. For a lifetime of 25 years, it is estimated that the project will help to avoid the emission of 395,000 tCO2.

3.2.3 Gender

3.2.3.1 Women represent 50.71% of the population in the Segou and Mopti regions, and particularly in the Djenné and Talo *cercles*. Women are the primary users of electricity that the project will generate. However, they are the least represented in terms of economic activities. Moreover, women are more prominent in less paid and less visible occupations, which makes their economic participation difficult to evaluate.

3.2.3.2 The project will actively contribute to alleviating women's domestic chores and developing income-generating activities by enabling 5,200 and 7,300 households in Djenné and Talo, respectively, to subscribe to electricity. Improving the quality of public services, especially health and education, improving the security of people and goods with public lighting, and better access to information and entertainment technologies will be of great benefit to women, young people and children in the localities concerned.

3.2.3.3 Furthermore, to contribute to women’s empowerment and through the Ministry for the Promotion of Women, Children and the Family (MPFEF), the project intends to develop multifunctional platforms (equipment and training) in 10 localities within the project area. This would contribute to the rational use of energy and diversification of sources of income.

3.2.4 Social

3.2.4.1 The project will have social benefits especially for rural dwellers, by improving the standard of living, helping to develop new skills, stimulating economic activities and creating employment opportunities. Fifty-five (55) localities will be served, with nearly 12,500 new customers expected including households, traders and craftsmen. The electrification of these localities will provide continuous lighting for students with beneficial effects, such as increased school attendance rates and improved school results. By offering the populace access to electricity, the project will contribute to reducing social inequalities.

3.2.4.2 While the customers of isolated networks managed by AMADER's licensees pay electricity between CFAF 280 and 350 per kWh, the electricity consumption of project beneficiary households will be billed on average at CFAF 97 on the "domestic" portion of the current fee schedule for the area managed by *Energie du Mali (EDM-SA).*

3.2.4.3 During project implementation, it is envisaged that some 400 decent temporary jobs will be created, of which at least 15% for women. To enhance the employability of young people looking for work, the project will recruit and train 20 young graduates, at least 50% of whom will be girls. The recruitment will be done in two waves of ten trainees during the project execution phase. Training will last 6 months, renewable once.

3.2.4.4 The negative social impacts that could result from project activities are work-related accidents and the risk of spreading HIV/AIDS. During operation, the misuse of electricity could cause electrocution and fires. Waterborne diseases also pose a risk to the population as a result of the Djenné and Talo dams. MPFEF will delegate the implementation of the "Communication for development" component, to bring about change in the behaviour of the local population concerned with regard to rational energy use, the fight against electric accidents, gender-based violence (GBV) and HIV/AIDS.

3.2.5 Forced Resettlement

3.2.5.1 Physical relocation will be practically avoided, except for five (5) buildings. 107 PAPs have been listed and they are owners of 499 planted assets (166 for Djenné and 333 for Talo), 1,845 m² of annual crops (972 for Djenné and 873 for Talo), and 5 built assets (2 for Djenné and 3 for Talo). Compensation measures will be implemented as set out in the Abbreviated Resettlement Plan, which contains appropriate measures that will be taken in favour of project-affected persons. Compensation, the total amount of which has been estimated at CFAF 33.3 million, will be paid in full before the actual start of works or each works phase. The compensation will be entirely financed by the Malian State.

IV. PROJECT IMPLEMENTATION

4.1. Implementation Arrangements

4.1.1 The Ministry of Energy will be the contracting authority and will provide project leadership. Project management will be delegated to *Energie du Mali (EDM-SA)*, which will ensure the development and maintenance of the works to be built. Project management activities will be assigned to a Project Management Unit (PMU) to be created within *Energie du Mali (EDM-SA)*. The company has already successfully implemented several projects financed by technical and financial partners. The PMU will comprise a coordinator (a senior executive, with service management experience), an electromechanical engineer specialized in hydropower generation, a power engineer specialized in distribution networks, a civil engineer, an environmentalist, a monitoring-evaluation expert, a socio-economist, an accountant, a procurement assistant, a management assistant and three drivers. The project coordinator will be seconded and exclusively dedicated to project tasks. The PMU will benefit from the services of an electrical engineer specialized in transformer substations (a member of the PMU staff of the 225-kV Guinea-Mali Interconnection Project (PIE-GM). The PMU will be supported by two individual consultants (specialists in procurement and administrative and financial management) who will be competitively recruited (as part of the PIE-GM project), and by an engineering consulting firm for works control and supervision.

4.1.2 A Steering Committee will be established by ministerial order to ensure proper project orientation, strengthen the participatory approach and achieve project objectives. The Committee will ensure coordination between all stakeholders for the smooth running of project activities, particularly with regard to crosscutting issues (environmental and social aspects, administrative authorizations, etc.). Its main mission will be to review project implementation progress, approve outcomes, reports, PMU annual activity plans and budgets, and make concrete proposals to the Government to address possible weaknesses identified

in project execution. The Committee will comprise representatives of the ministries in charge of energy, finance, planning, and environment, local authorities, public electricity structures (DNE, AMADER, and EDM-SA) and regional directorates or decentralized agencies in the project area. It will be chaired by the National Director of Energy and will meet at least twice a year.

4.1.3 Procurement Arrangements:

Procurements financed under the project will be made in accordance with the Procurement Framework for Bank Group-financed Operations, October 2015 edition, and provisions set out in the Financing Agreement. More specifically, procurements will be conducted as follows:

4.1.3.1 **Bank Procurement Methods and Procedures (BPM):** The Bank's Standard Procurement Methods and Procedures (MPA), based on the relevant standard bidding documents (BDs) will be used, in line with the recommendations of the Bank's assessment of the national procurement system, which requires the use of the Bank's procurement policies when projects are implemented by public institutions/enterprises and delegated project management agencies.

4.1.3.2 **Procurement Risks and Capacity Assessment (PRCA):** The assessment of the country, sector and project risks and the capacity of the Executing Agency (EA) on procurement was undertaken[2] for the project and the results used to guide the decision to select the Bank's system for procurements under the project. Appropriate risk mitigation measures have been included in the PERCA action plan outlined in para. B.5.9. of Annex B5.

4.1.3.3 In view of the urgent need for the country to operationalize the project and to mitigate the risks of procurement delays, the Government of Mali requested the Bank to accept in principle the use of advance contracting (AC) for the construction works of the mini power plants and associated networks, and the services of the consulting engineering firm that will be charged with works control and supervision. This authorization is made pursuant to the provisions of Article 11.2 of the Procurement Policy for Bank Group Funded Operations.

4.1.4 Financial Management Arrangements: Responsibility for project administrative, financial and accounting management will be vested on the Directorate of Studies and Strategic Planning (DEPS) of *Energie du Mali (EDM-SA),* which will host the project PMU. This Directorate is already implementing projects financed by the Islamic Development Bank (IsDB), the West African Development Bank (BOAD), as well as other bilateral partners. The PMU will have sufficient technical, human and material resources to put in place an effective internal control system and an acceptable financial management structure, notably through the correct and complete accounting of all transactions carried out during the project lifecycle, securing financial information and assets, updating and auditing data on available resources. Assessment of DEPS's capacity revealed that it lacked: (i) an administrative, financial and accounting procedures manual; and (ii) an integrated software adapted to the management of development projects. Generally, the financial aspects of ongoing projects are managed using an Excel.

Overall, the accounts will be kept based on a private-type accrual accounting using an integrated software adapted to development project management. The accounting plan will be drawn up based on the accounting standards of the Organization for the Harmonization of Business Law in Africa (OHADA) Uniform Act in force in Mali. Furthermore, the project will produce an annual work plan and budget (AWPB), as well as quarterly financial management reports based on the execution of the work programme and the annual budget, annexed to the quarterly activity reports submitted to the Bank, and which should provide a clear

[2] See Technical Annexes B5 for more details.

analysis between the budget forecasts and achievements of the quarter. Any discrepancies shall be analysed and explained. The project will be included in the annual work programme of the Controller General of *Energie du Mali (EDM-SA)*, through the risk audit department, which will ensure that the internal control mechanisms remain operational throughout the project implementation phase. Therefore, the department shall undertake regular periodic reviews of the various transactions carried out under the project.

4.1.5 Disbursement Arrangements: The TAF resources will be disbursed in accordance with Bank rules and procedures, particularly those contained in the disbursement manual, using the following three methods: (i) the special account method; (ii) the direct payment method; and (iii) the reimbursement method. Under the special account method, a special account in local currency will be opened in a local commercial bank acceptable to the Bank Group, into which the resources will be paid.

This account will operate under the double signature of two (2) authorized officers. It will receive funds from the Bank as working capital and will be used to cover eligible expenses related to operations, field missions and short training activities or workshops. The direct payment method will be used for expenditure, works, goods and services such as infrastructure construction contracts financed by TAF, institution building through the procurement of equipment and furniture, studies, inspections and works supervision, audits and other services, etc. The reimbursement method will be used only if necessary to pay back the project for eligible expenses and pre-financing from counterpart resources that the Bank would have authorized in advance.

4.1.6 Audit Arrangements

Accounts audit will be performed by an independent private audit firm. The firm shall be recruited based on the terms of reference previously agreed with the Bank and in accordance with Bank rules and procedures, latest three months following the effectiveness of the financing agreement. The audit contract will be for three years non-renewable and the auditor will be required to file the report no later than six months following the end of the related fiscal year.

4.2. Monitoring

4.2.1 The monitoring and evaluation expert will report periodically on the status of project indicators. The Bank's periodic supervision missions, the consulting engineering firm charged with works control and the project auditor would also monitor each stage of project implementation, to draw lessons as to the achievement of project objectives and appropriate actions to take in case of gaps.

4.2.2 The main project phases are presented in Table 4.1 below. Activities will be conducted based on the project implementation schedule.

Table 4.1 Main Project Implementation Phases		
Period	**Stages**	**Monitoring/Feedback Loop**
Jan. 2018 June 2018	Grant approval and effectiveness	• Grant Approval and General Information Note • Signature of Grant Protocol Agreement • Effectiveness and meeting of first disbursement conditions • Launch mission
Sept. 2017 to Jan. 2018	Recruitment of the consulting engineer	• Notice of Expression of Interest, bidding dossier • Approval of dossier and the evaluation report • Recruitment of the consulting engineer
Feb. 2018 to June 2021	Consulting engineering services	• Verification of engineering designs carried out • Preparation of works BDs • Factory acceptance, works control and supervision, works reception
Jul. 2018 to Dec. 2020	Electrical infrastructure construction works	• Equipment supply and installation • Control and supervision (consulting engineer) • Project supervision missions (Bank) • Monitoring of ESMP implementation
Jan. 2019 to Dec. 2020	Implementation of the Protocol Agreement for IEC-MCE Programmes	• Signature of the PMU/MPF Protocol Agreement • Services
June 2021 to Dec. 2021	Project completion	• Borrower's Project Completion Report • Bank's Project Completion Report

4.3. Governance

4.3.1 The main governance risks in implementing the project relate to the procurement process and the use of financial resources. Measures taken to mitigate these risks include: (i) preparing an administrative, accounting and financial procedures manual at project start-up; (ii) using the services of an experienced procurement expert; (iii) applying the Bank's rules and procedures for national competitive bidding, financed from grant resources; (iv) the Bank's review of contracts, particularly those related to the power plant construction and associated distribution networks, the total amount of which represents more than 75% of the total TAF grant resources; (v) regular control of petty cash expenses; (vi) the systematic inventory of project assets at the end of each accounting year; and (vii) audit of the financial statements, the annual reports of which will be submitted to the Bank latest six months following the end of each financial year. The Bank's advice and recommendations on the rationale for the special account, the supervision and audit mission reports, will help to mitigate the risks identified.

4.4. Sustainability

4.4.1 Project sustainability is underpinned by the strong commitment of the Malian Government to develop renewable energy sources, with its full involvement in the implementation of the SREP Investment Programme. The project's sustainability will be ensured by the availability of water resources for electricity generation. Its sustainability is also linked to the capacity of *Energie du Mali (EDM-SA)* to facilitate the operation and maintenance of installations set up. Despite the difficult financial situation facing *Energie du Mali (EDM-SA)*, the evaluation of the company revealed that the works maintenance policy is well followed and the rate of preventive maintenance highly satisfactory. Furthermore, several actions to improve governance in the sub-sector and the operation of *Energie du Mali (EDM-SA)* assets are underway, with funding from various donors and the Government. The rehabilitation of distribution and transport networks is underway (this will improve the technical performance) as well as the installation of prepaid meters, which will enhance the commercial management. Furthermore, Since the production cost of this project (CFAF 81 per kWh for the Djenné site and CFAF 115/kWh for the Talo site) is lower than the overall average cost of production of *Energie du Mali (EDM-SA)* (CFAF 130/kWh in 2016), the company will be able to obtain

financial resources from new consumption to cover the works maintenance and operating costs, estimated on average at 2.5% of the investment cost per year, effective from the commissioning date. Hence, people in the project area would have no difficulty in paying for their consumption since the average price of electricity would be much lower than the average cost that they would bear using their own generators (generally not below CFAF 350 CFAF).

4.5. Risk Management

4.5.1 The main risks identified are: (a) difficulties for *Energie du Mali (EDM-SA)* to take over the operation and maintenance of the new hydropower plants; and (b) insecurity in the project area.

4.5.2 The corresponding mitigation measures are:

(i) *Energie du Mali (EDM-SA)* is experienced in operating and maintaining hydropower plants. Besides, the company's officials will participate in installing the power plant equipment, to better take over maintenance after the project;

(ii) Economic operators in the project area are going about their activities. Moreover, the localities concerned are not in the zone considered dangerous. An AfDB-financed project (Bani and Sélingué Basin Irrigation Development Programme - PDI-BS) is underway in the same area and is being implemented without incident. Security in Mopti and Ségou regions has been a central preoccupation of Malian authorities since the end of 2016. On 3 March, 2017, the Malian government and the European Union delegation launched the Security Enhancement Support Programme in Mopti and Gao regions (PARSEC), costing nearly CFAF 19 billion and whose main objective is to contribute to the stabilization of the central region of Mali, by improving security for the populace, territorial control and management of the border areas by State services and in compliance with the rule of law.

4.6. Knowledge Management

4.6.1 The SREP Investment Program, of which the project is part, has been designed to promote the management and sharing of renewable energy (RE) knowledge in Mali. The knowledge and products generated under the project will promote the development of renewable energy in Mali, and will open opportunities for replication of good practices in countries of the sub-region.

4.6.2 During the works construction phase, Energie du Mali (EDM-SA) officials will be designated specifically to monitor services with a view to knowledge transfer. In addition, the IEC-MCE programs to be developed would constitute frameworks for sharing knowledge with the beneficiary population in terms of electrical safety and consumption management. The project also includes training for PMU managers to build capacity in their respective areas of activity.

4.6.3 The reports of the monitoring and evaluation expert, the external audit reports and the periodic progress project reports will serve as a basis for the Bank's supervision missions, from which lessons will be drawn. The publication of the supervision reports and the project completion report will make the knowledge available to Bank staff for consideration in future operations.

V. LEGAL FRAMEWORK

5.1 Legal Instrument

The project will be financed with a TAF grant to the Republic of Mali and a grant from the European Union African Facility Investment Fund (AfIF/EU) administered by the Bank within the project framework.

5.2 Conditions Associated with the Bank's Intervention

A) Conditions Precedent to Effectiveness

5.2.1 The effectiveness of the TAF Protocol Agreement shall be subject to signature by the Fund and the Donor.

B) Conditions Precedent to First Disbursement of Bank Resources

5.2.2 In addition to effectiveness of the Grant Protocol Agreement, the first disbursement of TAF resources shall be subject to the Donee's fulfilment of the following conditions, to the ADF's satisfaction:

5.2.2.1 Conditions precedent to first disbursement of the TAF grant:

- Provide the Fund with proof of the agreement signed by the Donee to on-lend grant resources to *Energie du Mali (EDM-SA)*, the terms and conditions of which are similar to those of the Grant Protocol Agreement signed with the ADF and that would have been approved beforehand by the Fund;

- Provide the Fund with proof of the appointment of key members of the Project Management Unit, including the Project Manager, the Monitoring and Evaluation Expert and the Environmentalist.

5.2.2.2 Conditions precedent to first disbursement of the African Investment Facility Grant of the European Union (AFiF/EU):

- Provide the Fund with proof of the agreement signed by the Donee to on-lend grant resources to *Energie du Mali (EDM-SA)*, the terms and conditions of which are similar to those of the Grant Protocol Agreement signed with the ADF and that would have been approved beforehand by the Fund.

C) Other Conditions

In addition, the Donee shall fulfil the following conditions:

(i) Provide the Bank, prior to or together with the first disbursement request into the special account, proof of the opening of a special account in a bank deemed acceptable to the AfDB to receive the grant resources;

(ii) Latest three (3) months after following the adoption of the 2018 budget, provide the Bank with proof of making provision in the national budget for counterpart funds for project financing;

(iii) Latest 120 days following the signing of the Grant Protocol Agreement, provide the Bank with proof of establishing the Steering Committee; and

(iv) Provide the Bank, prior to the effective commencement of works (or each tranche of work), proof of compensation of all persons affected in the project area, or where such compensation is not possible, deposit in an escrow account acceptable to the Fund, financial resources for that purpose in accordance with Bank rules and procedures.

D) Commitment

The Government undertakes to:

- Implement the recommendations from the ongoing tariff study, with a view to achieving the financial balance of the sub-sector through the application of more realistic and sustainable tariffs;

- pursue the electricity sub-sector reforms with a view to improving its technical and financial performance;

- implement the project and the Environmental and Social Management Plan (ESMP) and have them implemented in accordance with national law, recommendations, requirements and procedures contained in the ESMP and the Fund's relevant rules and procedures;

- provide the Fund with quarterly reports on the implementation of the project and the ESMP including, if necessary, weaknesses and corrective measures initiated or to be initiated.

5.3 Compliance with Bank Policies

5.3.1 The project complies with all applicable Bank rules.

VI. RECOMMENDATIONS

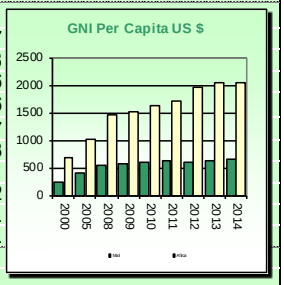
6.1 Management recommends that the Boards of Directors approve the proposal to award a UA 20 million grant to the Republic of Mali to finance the Mini Hydropower Plants and Related Distribution Networks Development Project, in line with the conditions set out in this report.

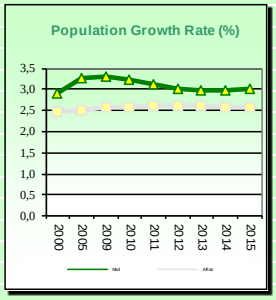
Appendix I

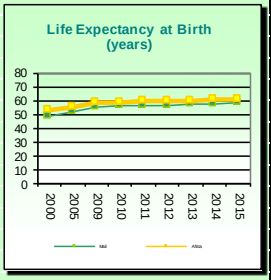
Mali

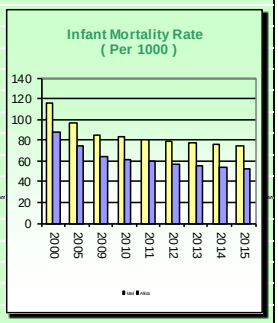
COMPARATIVE SOCIO-ECONOMIC INDICATORS

	Year	Mali	Africa	Developing Countries	Developed Countries
Basic Indicators					
Area ('000 Km²)	2016	1 240	30 067	94 638	36 907
Total Population (millions)	2016	18,1	1 214,4	3 010,9	1 407,8
Urban Population (% of Total)	2016	37,6	40,1	41,6	80,6
Population Density (per Km²)	2016	14,9	41,3	67,7	25,6
GNI per Capita (US $)	2014	660	2 045	4 226	38 317
Labor Force Participation *- Total (%)	2016	66,3	65,6	63,9	60,3
Labor Force Participation **- Female (%)	2016	50,3	55,6	49,9	52,1
Gender -Related Development Index Value	2007-2013	0,771	0,801	0,506	0,792
Human Develop. Index (Rank among 187 countries)	2014	179	...	...	...
Popul. Living Below $ 1.90 a Day (% of Population)	2008-2013	49,3	42,7	14,9	...
Demographic Indicators					
Population Growth Rate - Total (%)	2016	3,0	2,5	1,9	0,4
Population Growth Rate - Urban (%)	2016	5,2	3,6	2,9	0,8
Population < 15 years (%)	2016	47,4	40,9	28,0	17,2
Population >= 65 years (%)	2016	2,5	3,5	6,6	16,6
Dependency Ratio (%)	2016	99,8	79,9	52,9	51,2
Sex Ratio (per 100 female)	2016	102,0	100,2	103,0	97,6
Female Population 15-49 years (% of total population)	2016	21,9	24,0	25,7	22,8
Life Expectancy at Birth - Total (years)	2016	59,0	61,5	66,2	79,4
Life Expectancy at Birth - Female (years)	2016	58,8	63,0	68,0	82,4
Crude Birth Rate (per 1,000)	2016	42,3	34,4	27,0	11,6
Crude Death Rate (per 1,000)	2016	9,8	9,1	7,9	9,1
Infant Mortality Rate (per 1,000)	2015	74,5	52,2	35,2	5,8
Child Mortality Rate (per 1,000)	2015	114,7	75,5	47,3	6,8
Total Fertility Rate (per woman)	2016	6,1	4,5	3,5	1,8
Maternal Mortality Rate (per 100,000)	2015	587,0	495,0	238,0	10,0
Women Using Contraception (%)	2016	12,8	31,0	...	...
Health & Nutrition Indicators					
Physicians (per 100,000 people)	2004-2013	8,3	47,9	123,8	292,3
Nurses and midwives (per 100,000 people)	2004-2013	43,0	135,4	220,0	859,8
Births attended by Trained Health Personnel (%)	2010-2015	40,1	53,2	68,5	...
Access to Safe Water (% of Population)	2015	77,0	71,6	89,3	99,5
Healthy life expectancy at birth (years)	2013	51,1	54,0	57	68,0
Access to Sanitation (% of Population)	2015	24,7	39,4	61,2	99,4
Percent. of Adults (aged 15-49) Living with HIV/AIDS	2014	1,4	3,8	...	...
Incidence of Tuberculosis (per 100,000)	2014	58,0	245,9	160,0	21,0
Child Immunization Against Tuberculosis (%)	2014	79,0	84,1	90,0	...
Child Immunization Against Measles (%)	2014	80,0	76,0	83,5	93,7
Underweight Children (% of children under 5 years)	2010-2014	27,9	18,1	16,2	1,1
Daily Calorie Supply per Capita	2011	2 833	2 621	2 335	3 503
Public Expenditure on Health (as % of GDP)	2013	1,6	2,6	3,0	7,7
Education Indicators					
Gross Enrolment Ratio (%)					
Primary School - Total	2010-2015	77,2	100,5	104,7	102,4
Primary School - Female	2010-2015	73,0	97,1	102,9	102,2
Secondary School - Total	2010-2015	43,5	50,9	57,8	105,3
Secondary School - Female	2010-2015	37,4	48,5	55,7	105,3
Primary School Female Teaching Staff (% of Total)	2010-2015	28,6	47,6	50,6	82,2
Adult literacy Rate - Total (%)	2010-2015	33,1	66,8	70,5	98,6
Adult literacy Rate - Male (%)	2010-2015	45,1	74,3	77,3	98,9
Adult literacy Rate - Female (%)	2010-2015	22,2	59,4	64,0	98,4
Percentage of GDP Spent on Education	2010-2014	4,3	5,0	4,2	4,8
Environmental Indicators					
Land Use (Arable Land as % of Total Land Area)	2013	5,3	8,6	11,9	9,4
Agricultural Land (as % of land area)	2013	33,8	43,2	43,4	30,0
Forest (As % of Land Area)	2013	4,0	23,3	28,0	34,5
Per Capita CO2 Emissions (metric tons)	2012	0,0	1,1	3,0	11,6









Sources : AfDB Statistics Department Databases; World Bank: World Development Indicators; UNAIDS; UNSD; WHO, UNICEF, UNDP; Country Reports. *last update : August 2016*

*Note : n.a. : Not Applicable ; ... : Data Not Available. * Labor force participation rate, total (% of total population ages 15+)*

*** Labor force participation rate, female (% of female population ages 15+)*

Appendix II: Table of Bank Portfolio in Mali

(As at 30 October 2017)

N°	Sector	Project	Approval Date	Effective Date of First Disbursement	Closing Date	Approved Amount (UAM)	Disbursement Rate
1	**Agriculture**	Bani and Sélingue Irrigation Development Programme	27/05/2009	21/01/2010	31/12/2018	**44**	**60.4%**
2		Project to Strengthen Food Security through the Development of Irrigated Crops	03/12/2013	20/04/2015	31/12/2019	**36**	**30.1%**
3		Project to Strengthen Food and Nutritional Security in Koulikoro Region	17/09/2014	05/03/2015	31/12/2019	**36**	**18.6%**
4		Programme to Strengthen the Resilience to Food and Nutritional Insecurity in the Sahel	15/10/2014	23/10/2015	30/06/2020	**36.4**	**2.6%**
5	**Agro-Industry**	Project to Diversify the Activities of *Moulin Moderne du Mali*- M 3 (private sector)	17/09/2014	03/06/2015	10/11/2020	**13.3**	**75.5%**
6	**Water and Sanitation**	Bamako Drinking Water Project	09/10/2013	15/09/2014	31/12/2018	**50**	**24.7%**
7		Bamako City Sanitation Project	11/01/2017	Pas encore	31/12/2020	**30**	**0.0%**
8	**Transport**	Mali - Cote d'Ivoire Transport Development and Facilitation Project	26/11/2015	07/03/2017	31/12/2019	**70.8**	**9.5%**

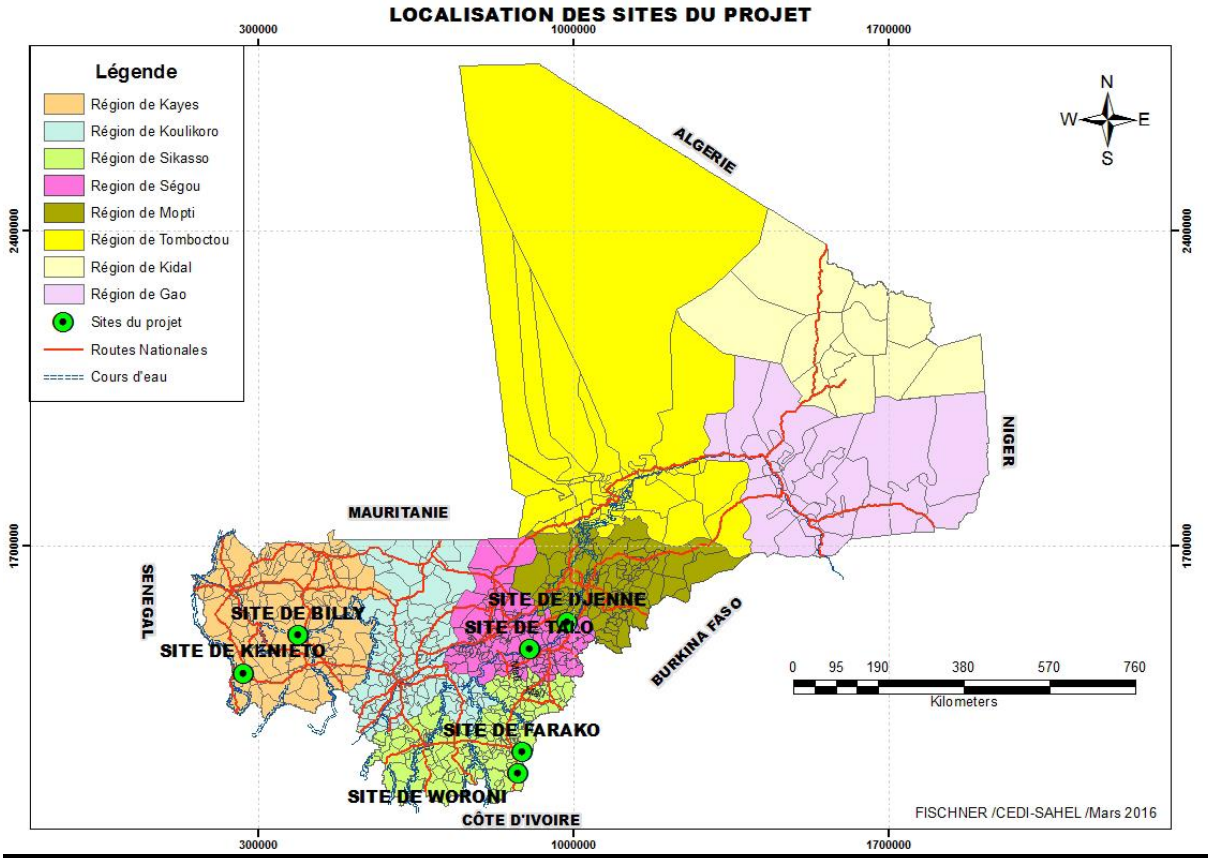
#	Sector	Project	Approval Date	Effective Date of First Disbursement	Closing Date	Amount Approved (UAM)	Disbursement Rate
11	**Governance**	Economic Governance Support Project	01/07/2013	08/05/2015	31/12/2017	**10**	**62.1%**
12		Economic Governance Reform Support Programme II – Budget Support	14/12/2016	10/02/2017	31/12/2017	**23.15**	**100%**
13		Spatial Planning Masterplans	28/02/2017	Not yet	3006/2018	**1**	**0.0%**
14	**Finance**	Line of Credit to "*Banque Malienne de Solidarité*"	06/07/2011	05/03/2015	30/09/2018	**4.4**	**100%**
15	**Energy**	Ségou Solar Power plant Project*	31/10/2016	Not yet	30/06/2020	**24.9**	**0.0%**
16		Project to Support the Renewable Energies Promotion Support Project**	22/10/2014	22/09/2015	31/01/2019	**1.5**	**12.8%**
17		Mini and Hydropower Plants Development Study	19/04/2013	11/02/2016	30/09/2017	**1.8**	**88.81%**
18	**Climate Change**	Accelerating the Construction of a Green Resilient Economy to Climate Change**	17/08/2015	Pas encore	31/12/2017	**0.3**	**0.0%**
19	**Social**	Capacity Building of the National Centre for Documentation and Information for Women and Children (CNDIFE)**	15/03/2016	15/02/2017	30/06/2017	**0.08**	**79.7%**
20		Project to Support the Socio-economic Reintegration of the People of Northern Mali	30/11/2016	Pas encore	31/12/2020	**10.5**	**0.0%**
21		Youth Forum on Employment and Peace by GYIN- Global Youth Innovation Network**	15/02/2017	13/06/17	31/03/2018	**0.06**	**22.4%**
Total/ Average						**396.9**	**30%**

Appendix III: Key Related Projects Financed by the Bank and Other Development Partners in the Country

Projects	Donors	Cost	Period
Project for the Construction of the Bamako National Control Centre and Doubling of the Capacity of the Sotuba II Hydropower Plant	BOAD and Govt. of Mali	CFAF 22494 million	2010-2018
Project to Develop the Ségou-Markala-Niono HT 63 kV Line	BOAD and Govt. of Mali	CFAF 12000 million	2008-2014
Energy Sector Support Project (PASE)	World Bank	USD 120 million	2009-2014
Project to Expand the Balingué Power Plant by additional 23 MW (IsDB)	IsDB	CFAF 197000 million	2013-2015
Sikasso and Bamako 225kV Electric Line Project	BIDC-Exim Bank and Govt. of Mali	USD 150 million	2012-2020
Taoussa Hydropower Dam	Kuwaiti Fund; IsDB; BOAD; Saudi Fund; OPEC; BADEA; BIDC; Abu Dhabi Fund and Govt. of Mali	CFAF 130 Billion	Started in 2007, ongoing

Appendix IV: Map of Project Area

Location of Project Sites



APPENDIX V: NOTE ON THE ELECTRICITY SUB-SECTOR IN MALI

The situation of the electricity sub-sector in Mali, the details of which are given in Technical Annex A, is summarized as follows:

Mali is a West African country with a population estimated at 18.1 million in 2016, 37.6% of which dwell in urban centres. The country's human development index stood at 41.9% end-2014 and is among the lowest in the world, with 91% of the population earning less than USD 2/day.

The electricity sub-sector is relatively undeveloped, with a national electricity access rate of 41%. In rural areas, formal access to electricity is only 17% compared to 66.8% in urban areas. The overall production capacity end-September 2017 is 556.2 MW, including 486.2 MW on the interconnected network. The production park on the interconnected network is shared between hydropower 37.7% and thermal 62.3%. Due to the obsolescence and unavailability of some production plants, the *Energie du Mali* (EDM-SA) (the Mali power utility company) is unable to meet all the needs of its customers and continues load-shedding despite imports from Côte d'Ivoire (about 50 MW) and the purchase of energy from Independent producers (about 98 MW in 2016).

Moreover, the preponderance of thermal energy in the energy mix is detrimental to *Energie du Mali* (EDM-SA), which regularly records deficits owing to the very high cost of the energy produced. This makes the subsector highly dependent on hydrocarbons, whose import is constantly increasing due to the demand of a rapidly growing population (doubling every 20 years) and economic growth. This situation exposes the entire economy to oil price volatility. However, opportunities to develop renewable energies (hydro, solar, and wind turbines) are underutilized. In fact, only 250 MW of hydropower is exploited to date on the Niger and Senegal rivers, albeit the potential for 1,000 MW. The country could become a major producer of solar energy because it enjoys 7 to 10 hours of sunshine a day year round (with an average irradiation of 5 to 7 kwh/m2/d against a global estimated average of 4-5 kwh/m2/d).

It is in this context that the Government of Mali, through the first strategic axis, "Inclusive and Sustainable Economic Growth" of the Economic Recovery and Sustainable Development Strategic Framework (CREDD 2016-2018), made energy infrastructure development a priority, and decided to diversify the production park, which will involve harnessing the hydropower potential, exploring the possibilities offered by solar, biofuels and wind turbines, and increase the rate of interconnection to the sub-region's power grid.

At the institutional level, *Energie du Mali (EDM-SA)*, a semi-public company in which the Malian State has a share capital of 66% and the IPS WA (Industrial Promotion Services West Africa) 34%, is the main dealer of public electricity service in Mali. It is responsible for the production, transportation and distribution of electricity in the country on the interconnected network and in the major cities. Production activity is open to the private sector. The monopoly of energy bulk purchase that *Energie du Mali (EDM-SA)* enjoyed since 2000, ended on 31 December 2010, opening the possibility for third parties to access the network.

Moreover, the price of electricity, although relatively high (on average CFAF 97/kwh end-2016), is insufficient to cover the cost of electricity distributed (CFAF 130/kwh). The current regulatory framework does not sufficiently favour private investment in the energy sector, despite the strong involvement of the private sector in rural electrification over the past five years. *Energie du Mali (EDM-SA)* has recorded deficits in recent years, which is accumulating and unbalancing its financial situation. The company's solvency is affected and if nothing is done on time, it will be unable to continue honouring its financial commitments in the medium and long term. The 225 KV Guinea-Mali Electricity Interconnection Project will allow it to import electricity at a much cheaper cost than the current kWh price, hopefully improving its financial situation. This improvement in the financial situation is contingent on the application of realistic prices or the payment of sufficient compensation by the State to ensure the financial balance of the sub-sector.