PROJECT INFORMATION DOCUMENT (PID)
APPRAISAL STAGE

Report No.: PIDA2247

Project Name	Mali Rural Electrification Hybrid System Project (P131084)
Region	AFRICA
Country	Mali
GEF Focal Area	
Sector(s)	Other Renewable Energy (80%), Transmission and Distribution of Electricity (20%)
Theme(s)	Rural services and infrastructure (100%)
Lending Instrument	Specific Investment Loan
Project ID	P131084
Borrower(s)	Government of Mali
Implementing Agency	AMADER
Environmental Category	B-Partial Assessment
Date PID Prepared/Updated	18-Oct-2013
Date PID Approved/Disclosed	18-Oct-2013
Estimated Date of Appraisal Completion	24-Oct-2013
Estimated Date of Board Approval	19-Dec-2013
Decision	

I. Project Context

Country Context

1. Mali is a large (1,241,238 square km) landlocked country in the Sahelian belt in West Africa. It has a rapidly growing population of about 15.8 million unevenly distributed due to the fact that about 60 percent of its surface area is desert. Population density is low and highly dispersed. The majority of the population (about 73 percent) lives in rural areas.

2. From 1991 to the coup of March 2012, Mali was considered an example of democratic governance and political stability. The coup of March 22, 2012 took place in a country with a strong democratic record in which two non-violent democratic transfers of power have taken place during the past 20 years, and was on track to organize a third presidential election. Mali's progress in building a democratic political system did not however translate into an effective and accountable governance system.

3. In 2012 and the beginning of 2013, Mali faced a complex crisis on three fronts (conflict and insecurity in the North, institutional and political turmoil in the South, and humanitarian and food insecurity across the country due to the 2011 drought) that has eroded the base of Mali's

economy and society, including the government ability to provide basic services for men and women. However, prospects for the remainder of 2013 and 2014 are positive: the liberation of the Northern part of the country with the assistance of African and international forces, led by France, and the swift adoption by the Malian authorities of a transition roadmap to restore democracy and peace have opened the door for the international community to resume development assistance. Presidential elections that took place on July/August 2013 resulted in the democratic election of Mr. Ibrahim Boubacar Keita for a period of five years. Parliamentary elections will follow and are expected to take place before the end of 2013.

4. Mali's per capita Gross National Income (GNI) was about US$610 in 2011. The country was ranked 182 out of 186 countries by the 2012 United Nations Development Program (UNDP) Human Development Index. Over the decade preceding 2012, Mali was able to achieve relatively high economic growth but more modest increase in revenue per capita given the increase in population. Over the period, annual growth of the Gross Domestic Product (GDP) averaged 5 percent, equivalent to 1.5 percent annual increase per capita. Over the period, the poverty rate declined (from 55.6 to 43.6 percent), however the absolute number of poor people increased slightly given population growth. Most poor derive the majority of their income from subsistence farming and are therefore exposed to natural risks. In detail and according to the Mali Interim Strategy, around 75 percent of economically active Malians work in the agriculture sector, including 74 percent of economically active women. Overall, Mali remains one of the poorest countries in the world with about half of the population living below the poverty line of US$ 1.25 per day.

5. Poverty has increased as a result of the drought of 2011 and the political crisis of 2012 from an estimated 43.6 percent in 2010 to 46.0 percent of the population at the end of 2012 – which is likely to worsen the gender situation, in particular the gender differences in key social and economic areas in Mali. Although the economic outlook depends, in the short term, on the progress in the political and security situation on the ground, the growth rate is expected to return to its trend level of around 5 percent in 2013. Prospects for sustained growth and job creation will depend on increasing agricultural productivity, strengthening micro and macro-economic resilience, fostering regional integration, organizing the informal sector, and addressing population growth, malnutrition and gender disparities. This requires action in a number of areas, including irrigation, education and skills development, basic service delivery and safety nets, infrastructure, as well as continued improvements in the business environment and regional policy coordination.

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6. Following the March 2012 coup d'état, the Bank triggered Operational Policy (OP.)7.30 on Dealing with De Facto Government suspending disbursements and preparation of new lending operations. However, following an assessment mission in the summer, the Bank authorized resumption of ongoing operations in September 2012. A new Interim Strategy Note (ISN) was presented to the Board on June 18, 2013 together with a budget support operation.

Sectoral and institutional Context

7. In spite of significant progress over the last decade, access to modern energy services remain low in Mali, especially in rural areas. About 80% of household energy needs remain satisfied by biomass resources (wood and charcoal), which cause health problems among the rural population through indoor air pollution, and aggravates environmental problems such as deforestation and land degradation. According to the Mali Interim Strategy, women and children are often responsible for

most of the household chores including cooking and fuel collection – which is often further and further from home due to deforestation. This disproportionate domestic work burden puts them at greater health risks due to poor ventilation as well as increased drudgery, time loss and potential gender based violence during wood collection. As a consequence, women's health and time poverty is particularly affected by poor access to electricity and to clean, modern fuels for cooking.

8. Over the last ten years, the Malian authorities have implemented policies to increase access to modern energy service, in particular to electricity. Current rates of access to electricity in Mali are estimated at 30% nationally, corresponding to an access rate of 55% in urban areas and 15% in rural areas. Electricity service provision in urban areas is under the responsibility of the State-owned national utility, Energie du Mali (EDM-SA). Over the last decade, EDM-SA has been able to expand access to electricity at a sustained pace in major urban centers and some peri-urban areas. At the end of 2012, EDM-SA had a client base of 290,000 connections, against 120,000 ten years earlier.

9. However, a majority of the Malian population lives outside of the EDM-SA concession perimeter. In order to reach this population and achieve the rural electrification goals set in its National Energy Policy, the GoM launched an ambitious rural energy access program. This program was implemented under the responsibility of a newly created rural electrification agency, AMADER. Also, from 2004 to 2012, the IDA-financed Household Energy and Universal Access (HEURA) project implemented by AMADER played a critical role in the development of the Malian rural electrification sector. It is estimated by AMADER that 1,200,000 people gained access to modern energy services through the project (based on fairly extensive definition of access including some populations benefiting from public lighting). While the progression in rural access has been impressive (a ten-fold increase from 1~2% of the rural population to 18% in less than a decade), it has not yet reached a large majority of the rural population. The large majority of rural households still satisfy their energy needs by using kerosene and dry-cell batteries, which are extremely expensive and unreliable.

10. Mali is faced with structural barriers impeding its efforts to increase access to electricity. This includes the high cost of new generation and the dependency on petroleum product imports. Thermal generation is entirely based on imported petroleum products (diesel, Heavy Fuel Oil) which are especially costly in Mali a landlocked country located far from the importing ports in the region (Dakar, Abidjan, Lomé…) and connected with them through poor transport infrastructure. For this reason, hydropower is a critical resource for Mali. Following the commissioning of the Manantali regional hydropower plant in 2002, Mali has managed to aggressively increase access to electricity over a 10-year period. However, with power consumption growing at around 8 percent per year, new generation needs to be brought online to meet demand. The Félou hydropower plant, which as Manantali is located on the Senegal River and has been developed as a regional project under OMVS (Organization for the Management of the Senegal River Basin) is nearing completion and will, from 2014 onwards, bring annually about 135GWh of additional generation for Mali (equivalent to about 15 month of demand growth). Other small and medium sized hydropower plants are planned or under consideration. While these sites appear to belong to a least-cost development strategy, they will not be sufficient to meet the growing demand for electricity, due to their small size and run-of-river nature (the high demand season for electricity in Mali in March to June does not correspond to the rainy season in August and September). In addition, climate variability can impact the reliability of hydropower generation. Climate variability also impacts agricultural production, which relies on water and energy, with the potential to create a domino

effect across sectors, affecting rural and urban communities.

11. Given increased energy co nsumption over time due to a fast growing population (doubling every 25 years) and economic growth, and the constraints on alternative energy sources (wood fuel, in particular due to deforestation), Mali is likely to remain dependent on oil products imports for transportation, cooking and a significant share of power generation for the decades to come. This is exposing the economy as a whole to the volatility of oil prices. Local energy service providers in rural areas that operate isolated fossil fuelled mini-grids are particularly exposed to volatile fuel prices. For this reason, the Malian authorities are increasingly looking at solar energy as a potential resource, which could be exploited gradually as the prices of equipment falls with technological progress. This objective of gaining operational experience and building local capacity in solar applications explains why two of the three components of the national investment program presented as part of SREP are dedicated to solar energy investments.

12. A second structural handicap is the high cost of network expansion. Expanding the national electricity grid to reach a larger proportion of the population would require huge investments in transmission and even more in distribution because the overall population density of Mali is low and rural population are dispersed. Network expansion also tends to reach households which are on average poorer than existing customers with low individual consumption. For this reason, the national network expansion will necessarily remain limited in the foreseeable future and focus on: (i) expanding the distribution network in peri-urban / recently urbanized areas (especially around Bamako), and (ii) connecting to the national grid isolated localities with relatively high level of demand. This would still leave out a majority of the Malian population. For this reason, it is necessary to develop alternative solutions for providing access to modern energy services to this fraction of the population. A possible approach is the development of rural minigrids, which has been the primary strategy promoted by AMADER. For the rest of the rural population, non-grid solutions such as Solar Home Systems (SHS) or efficient solar powered lighting products will be required. The proposed project will support both approaches (hybridization of rural minigrids, as well as SHS and lighting products).

13. In addition, the Malian electricity sector is facing serious short-term operational and financial challenges, related to high oil prices and the failure to implement cost-reflective pricing. Over the last decade, EDM-SA has been able to expand access to electricity at an aggressive pace. Initially, the expansion of grid-electricity was made possible by the availability of low-cost hydropower from the commissioning of Manantali hydropower plant. However, around 2006, growth in electricity demand resulted in Mali absorbing the entirety of its share (50 percent) of generation from Manantali. In order to meet additional demand, the Government adopted a strategy combining expensive short-term domestic thermal generation with longer term regional solutions expected to result in lower generation costs, including the construction of an interconnection with Cote d'Ivoire, and further development of Mali's hydropower potential (Félou regional hydropower project in particular). This investment strategy was sensible but implied, at least in the medium term, that incremental generation would come primarily from thermal generation (based on diesel oil or HFO) at a much higher cost. This shift in the generation mix should logically have been reflected in adjustments to the regulated national electricity tariffs. However, from 2004 to 2012, the Malian authorities failed to implement any tariff adjustments, with the exception of limited increase in 2009 (~3% in average). The national utility company was therefore faced with mechanical increases in operating costs which it could not pass-on to consumers. This resulted in an increasingly distressed financial situation and contributed to a deterioration of its technical and operational

performance, characterized by illiquidity and the accumulation of short term debts (with local Banks and suppliers). Faced with structural negative cash-flows, EDM-SA reduced capital and maintenance expenditure to a bare minimum, contributing to a situation of imbalance between supply and demand, and reduced reliability. Since 2010, significant GoM subsidies to EDM-SA have been required to cover operating costs (fuel purchase) and maintain electricity supply.

14. The level of subsidy to EDM-SA for 2013 has been temporarily increased to FCFA 40 billion for 2013 (equivalent to US$ 80 million) in order to put the company in a position to reduce its stock of arrears. In addition, the GoM took a first step towards cost-reflective electricity tariffs by allowing an average increase of 6% in February 2013. In order to reduce the level of subsidy to EDM-SA, additional measures will be needed, including further tariff adjustments and an acceleration of generation investments. In addition, EDM-SA has been required by the GoM to prepare a short-term recovery plan identifying measures to improve operational performance and reduce costs.

15. The Malian rural electrification model: The Malian rural electrification model is widely regarded as successful in the sub-region. It is largely a bottom-up model, driven by decisions from local private entrepreneurs / cooperatives to construct and operate small-scale mini-grids in rural areas based on their perception of the local market. Investment subsidies from the Rural Electrification Fund (REF) are designed to arrive at affordable tariff levels for rural customers and provide an acceptable financial rate of return for the private operators. Investment subsidies in new rural minigrids were limited to 70-80% of capital investment costs. Subsidy allocation was driven in particular by results-based criteria (established on the number of customers to be connected during the first two years, the average tariff and the cost of investment by connected off-grid customers). No subsidies for energy consumption or operating expenses are provided. Local private operators have provided an average matching co-financing of 25% of the mainly thermal rural electrification projects.

16. The increase in oil prices has impacted rural minigrids operators to even a larger extent than the national utility. Most rural minigrids are entirely reliant on generation with small gensets running on diesel oil. In order to cover their operating costs, rural operators have been forced to increase prices, and in some cases reduced service hours. The application of price increases in rural localities is creating significant social tensions. Electricity prices in rural minigrids are typically around 250 FCFA/kWh (50 USc/kWh). In comparison, the average regulated tariff for EDM-SA clients remains on average below 100 FCFA/kWh (20 USc/kWh) even following the recent adjustment applied in February 2013. In parallel with increased cost- reflectivity of regulated utility tariffs, reducing the fuel costs of rural operators could contribute to bridge part of the gap in energy costs between urban and rural households.

17. AMADER plays a central role as the agency in charge of (i) promoting electrification in rural and suburban areas, (ii) working with all types of operators, national and international private operators, NGOs, decentralized groups, cooperatives, etc. (iii) providing technical assistance and financial support (investment subsidies), and (iv) acting as de facto regulator in rural and suburban areas. AMADER is responsible for analyzing and selecting the initial business plans of operators, providing initial investment subsidies out of the Rural Electrification Fund (REF) and monitoring the operators. Minimum technical specifications and quality of service standards that a rural electrification operator must comply with are set in the contractual documents (and reflected in the business plans of rural electrification projects). Typically, private operators obtain off-grid

concession for a period of 15 years. As part of its mission to monitor the implementation of concession-type contracts, AMADER authorizes electricity prices adjustments for rural operators. The general principle established by sector legislation is that electricity prices in rural areas are not regulated. The role of de facto regulator exercised by AMADER results from contractual stipulations with rural mini-grids operators and is a logical counterparty to the initial investment subsidies. Overall, this arrangement has proved fairly resilient, allowing minigrids operators to continue to operate even faced with political instability, internal armed conflict, and rising fuel prices in 2012. Still, the exposure of rural operators to volatile and rising diesel prices remain a threat to their long-term viability and an obstacle to further expansion.

18. Emergence of local private rural electrification operators: A significant number of local private or community-based (communities, women associations) energy actors have emerged with the support from AMADER and the Rural Electrification Fund. More than 60 operators are currently active for about 190 mini-grids. The operators have tested, through their projects, both market appetite and different technical and institutional arrangements for rural electrification schemes. A tendency towards concentration of the sector can be observed. While a large number of single site operators remain, four multisite companies have emerged with 15 to 20 sites each. This consolidation appears to facilitate professionalization of the operators, through diffusion of experience and best practices and increased specialization. Given the political and security situation of Mali, local actors are likely to conserve comparative advantages for the management of rural energy concessions, possibly in partnership with foreign firms. While there is a trend towards multisite operators compared to local management, establishing good relationships with the local communities is critical for operators. For all minigrids supported by AMADER, a local committee representing the community (comité villageois) has been established in order to create a channel for communications and discussions with the operator and with AMADER.

19. Local economic impact of rural electrification: Rural electrification appears to be a significant driver for income generating activities, which can have considerable impacts on improved livelihoods of men and women within rural communities and women's organizations who may be using manual labor or time intensive activities that can benefit from mechanization. An impact evaluation survey carried out in 2009/2010 to assess the impact of rural electricity provision from a representative sample of 2,000 rural consumers has highlighted the importance of rural electrification for the creation and growth of income-generating activities.

20. Integrating gender considerations into the design and implementation of energy activities. AMADER's track record in mainstreaming gender in its programs is exemplary in the African sub region and is strongly recognized and appreciated by partners and stakeholders. The gender work in Mali was initiated in 2011 when a field level and institutional gender assessment was conducted to review AMADER's operations in 3 out of Mali's 8 regions. This intervention reviewed the gender impacts of AMADER programs, working procedures, and assisted AMADER in the development of a gender strategy and action plan. The action plan resulted in two notable outcomes: (1) the institutionalisation of a full time gender focal point; and, (2) the design of an investment plan to operationalize the main recommendations of the assessment. This plan attracted various stakeholders including UNWomen and local NGOs who agreed with AMADER to execute the joint program in February 2012, « Energy for the reduction of gender inequality in Mali » focusing initially in 19 rural localities before the military coup. During the political instability, the gender situation worsened, due to a combination of higher exposure of women to the direct consequences of violence and exclusion. In addition, property and other rights have also been affected by the

crisis which might particularly affect women. Despite the difficulties of the political uncertainty, the gender and energy program continued its work and was able to initiate activities in 2 pilot localities (Simidji and N'Tobuougou) in 2013. The pilots have focused on strengthening off-grid power solutions to community centres, training on construction/distribution of improved cookstoves and productive uses of energy services. AMADER's commitment to implementing activities specifically benefiting rural women even during these difficult times constitutes a tangible demonstration of ownership. The program will continue and be scaled up under this project.

21. Given the geography of Mali, over the next decades, projected expansion of the national electricity grid or regional integration of power systems are unlikely to allow connecting a large proportion of rural households. Isolated off-grid or mini-grids rural electrification schemes will therefore remain for a long time the only option to bring modern energy services to a large proportion of the population. Recently, with support from bilateral donors (Russian, Dutch, German), a few solar PV and biofuel mini grid pilot projects have been tendered to test the introduction of renewable energy in existing thermal mini-grids on a project by project basis. A significant pipeline of business plans is under development, with technical assistance provided by AMADER, awaiting financing from the Rural Electrification Fund. This demonstrates the interest of rural populations and private operators in the energy services delivery business in Mali.

22. The proposed project aims at strengthening and further scaling-up rural electrification through the introduction of hybrid PV solar/diesel generation in rural mini-grids and installation of Solar Home Systems (SHS) when the cost of mini-grids' expansion is not economically justifiable.

II. Project Development Objective(s) / Global Environmental Objective(s)

A. Project Development Objective(s)

The project development objective is to expand rural access to modern energy services and to increase renewable generation in target areas.

III. Project Description

Component Name

Component 1: Service improvement and expansion of existing mini-grids

Comments (optional)

This component will increase renewable energy generation capacity in the existing power stations supplying rural mini grids and expanding those mini grids.

Component Name

Component 2: Development of Off-grid Lighting Markets and Energy Efficiency

Comments (optional)

Its aims to expand off-grid lighting and solar lanterns in target rural areas through catalyzing the markets, and improve energy efficiency and promote a use of electricity on targeted mini-grids.

Component Name

Component 3: Project Management Support and Capacity Building

Comments (optional)

This component supports capacity building and technical assistance to AMADER and private operators as well as project management support.

IV. Financing *(in USD Million)*

Total Project Cost:	45.40	Total Bank Financing:	25.00
Financing Gap:	0.00		

For Loans/Credits/Others	**Amount**
BORROWER/RECIPIENT	0.00
International Development Association (IDA)	25.00
Climate Investment Funds	15.40
Global Partnership on Output-based Aid	5.00
Total	45.40

V. Implementation

VI. Safeguard Policies (including public consultation)

Safeguard Policies Triggered by the Project	**Yes**	**No**
Environmental Assessment OP/BP 4.01	×	
Natural Habitats OP/BP 4.04		×
Forests OP/BP 4.36		×
Pest Management OP 4.09		×
Physical Cultural Resources OP/BP 4.11	×	
Indigenous Peoples OP/BP 4.10		×
Involuntary Resettlement OP/BP 4.12	×	
Safety of Dams OP/BP 4.37		×
Projects on International Waterways OP/BP 7.50		×
Projects in Disputed Areas OP/BP 7.60		×

Comments (optional)

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