I. Project Context

Country Context

Sub-Saharan Africa (SSA) continues to face challenges in the power sector, with only one in three Africans having access to power. The population of SSA is roughly 800 million and the combined generation capacity in the region stands at only 68 GW. In comparison, Spain has similar generation capacity, with a population of 40 million. Excluding South Africa, SSA’s power consumption is low, at about one percent of the Organization for Economic Cooperation and Development (OECD) levels. Average power costs are approximately double those found in the rest of the developing world. Cheaper and cleaner energy sources, such as hydropower, geothermal, and natural gas, are unevenly located. A change of the energy mix away from thermal generation can only be achieved through regional interconnections.

The 15 member states of the Economic Community of West African States (ECOWAS) occupy some five million square kilometers and are currently home to about 300 million people. About half of the ECOWAS population lives in poverty with less than US$1.90/day, and it is estimated that at least 170 million people still lack access to electricity. A substantial reduction of poverty will require sustained economic growth. This in turn will require massive investments to make up for current deficits in infrastructure. The high cost of infrastructure, particularly in some of the smaller ECOWAS countries, has been a barrier to development. Recognizing that past efforts to achieve national self-sufficiency in electricity supply have been uneconomical due to the high cost of establishing power generation and transmission infrastructure, ECOWAS Member States have...
established the West African Power Pool (WAPP), a cooperative power pooling mechanism for integrating national power system operations into a unified, regional electricity market. Mali, Mauritania, and Senegal are part of the WAPP.

Regional power trade is even more important in West Africa than elsewhere on the continent. Eleven out of 15 countries in West Africa are small economies (gross domestic product less than US$5 billion) and thus do not have enough demand to develop the electricity sector at scale to achieve lower cost generation capacity. The cost of electricity generation is very high as a result of the region’s high dependence on expensive (and polluting) oil-based thermal generation. Even so, high tariffs of US$0.20-US$0.30 per kWh (compared to an average of US$0.10 per kWh in the United States, for instance) are still not sufficient to cover the cost of supply.

Mali is a vast, landlocked, geographically diverse country in West Africa, with a population of approximately 17 million and per capita GNI of US$720 in 2015. Over the past several years, Mali’s economic growth has been influenced by several exogenous shocks. The country’s steady state growth rate has hovered around 4.5 percent over the last decade, driven by rapid growth in labor supply, urbanization (along with informal sector and tertiary sector development), extensive agriculture, public investment, and gold mining activities. The structure of its GDP has remained relatively stable since 1990 with the primary (agriculture, gold) and tertiary sectors (trade, transport, and public administration) each contributing 35-40 percent to GDP, with the secondary sector making up the balance. Mali’s industrial sector is limited (four percent of GDP) and consists largely of privately owned, small enterprises and a few large enterprises (cotton milling and mining). However, economic growth often deviated from this steady state trajectory as a result of climatic, political, and price shocks. Mali’s economy is projected to grow by around five percent annually over the next three years, reflecting a return to normalcy and a gradual tapering of the recent surge in international aid. The Government however faces the dual challenges of repositioning the Malian economy on a rapid and sustainable growth trajectory while tackling governance challenges. In this context, reliable and affordable access to electricity services will pave the way to further job creation. Over the last few years, Mali has experienced a growing electricity gap due to a lack of investments along the value chain, and it is increasingly dependent on high cost fossil fuels to fill that gap. Mali’s economy would benefit from the import of low cost electricity.

Mauritania is located on the western coast of Africa, with a population of four million and per capita GDP of about US$1,260 in 2015. The country has a wealth of natural resources, particularly in the mining sector, and has experienced sustained growth thanks to a period of high international commodity prices. The country is Africa’s second leading exporter of iron ore and also exports gold and copper, two exports with significant growth potential. In addition, Mauritania is a modest oil producer and possesses considerable natural gas deposits offshore. Mauritania’s waters have some of the most abundant fish stocks in the world. However, with the end of the commodity supercycle in the second half of 2014 and the collapse of iron ore prices, pressures on growth have started to appear in Mauritania. With a 10.3 percent drop in mineral production, economic activity continued to slow down in 2015. Real GDP growth fell to three percent by the end of the year, down from 6.4 percent in 2014. Moreover, all non-tradeable domestic sectors that had previously benefited on the back of the mining boom, such as utilities, transport, and telecommunications, showed signs of deceleration. Even the construction sector was impacted despite benefitting from public investment spending, with imports of construction materials dropping 3.8 percent. This
leaves the economy exposed to external economic shocks. Mauritania acknowledges the need to implement policies that improve governance, increase resilience to external shocks, and are conducive to accelerating sustainable growth and creating jobs. In this context, improving the access to competitive electricity services will be key in the coming years.

Senegal is a country located on the western coast of Africa, with a population of 14 million and per capita GDP of about US$1,050 in 2015. The economy of Senegal is based on agriculture and mining industries. Over the course of 2015, Senegal’s macroeconomic performance has been strong with a growth rate of 6.5 percent, a rate that has not been achieved since 2003. This performance is remarkable given the depressed global environment that has contributed to many African countries registering a marked slowdown in their economic activities. As a result, Senegal was the second fastest growing economy in West Africa, behind Côte d’Ivoire. The main drivers of growth were higher private sector demand, stimulated by lower energy and transport prices, as well as the ambitious public investment program carried out by the Government, up by almost 0.4 percent of GDP in 2015. The economic outlook remains favorable in the short term with growth projected to have reached 6.5 percent in 2016, with the economy driven mainly by the services sector, particularly telecommunications and financial services. The rebound in agriculture coupled with the end of the Ebola epidemic will benefit the national economy. Economic activity will be further strengthened by lower oil prices, reduced production costs, and electricity subsidies. Senegal acknowledges the need to implement policies that improve governance, increase resilience to external shocks, and are conducive to accelerating inclusive and sustainable growth to promote job creation. In this context, improving the access to competitive electricity services will be key in the coming years.

The proposed project is a regional project benefiting Mali, Mauritania, and Senegal, with enhanced trade opportunities within the WAPP that aims at promoting regional integration under the ECOWAS framework. With growing populations, energy demand is expected to grow, requiring additional generation capacity for the region. Currently, the power system developed by the Senegal River Basin Development Organization (OMVS), whose members include Mali, Mauritania, and Senegal (and more recently Guinea), has allowed for the development and sharing of hydropower electricity, which has been key to reducing electricity costs in each of these countries. The proposed project will not only expand the electricity trade between the three countries, but it will integrate the OMVS system to the broader WAPP power system. This will open the possibility for the WAPP countries to access new and more diversified energy sources, which is a well-supported regional strategy.

**Sectoral and institutional Context**

The OMVS interconnected grid is the most advanced sub-regional power pool in West Africa. This grid is composed of the Manantali Interconnected Network (RIMA,) managed by the Manantali Energy Management Company (SOGEM), and the grids of the national electricity companies of Mali, Mauritania, and Senegal (EDM, SOMELEC, and SENELEC, respectively). The RIMA comprises: (i) the 200 MW hydroelectric plant at the foot of the Manantali Dam; (ii) a 1,600 km long system of 225kV transmission lines and substations that evacuate the electricity produced at the Manantali hydroelectric plant to the main load centers in Bamako (Mali), Nouakchott (Mauritania), and Dakar (Senegal), operated in real-time by a central load dispatching system located at Manantali; and (iii) the Felou 60 MW run-of-the-river hydroelectric plant located on the Senegal River in Mali about 200 km downstream of the Manantali hydroelectric plant, with an
interconnection to the 225 kV transmission system. Gouina, a 140 MW run-of-the-river hydroelectric plant, located on the Senegal River in Mali about 160 km downstream of the Manantali hydroelectric plant and about 40 km upstream the Felou hydroelectric plant is expected to come on line in 2019.

RIMA’s production represents 25 percent of the electricity supply to Mali, Mauritania, and Senegal. Given the steady population growth, these countries require increased generation capacity. Mali, Mauritania, and Senegal share the energy produced at Manantali and Felou amounting to a total of 1,142 GWh through the RIMA (see Table 1 for the energy flows from Manatali and Felou to each country). However, they currently need to supplement the hydropower generation with oil-based thermal power generation to meet their electricity needs. Partly as a result of this generation mix, coupled with relatively high technical and commercial losses, the utilities in the three countries have been incurring financial losses and have been increasingly relying on government support to cover their operating costs and finance the required investments to expand their systems. 9.

Electricity service provision in urban areas is provided by Energie du Mali S.A. (EDM), the vertically integrated utility, who has monopoly over transport and distribution of power within the perimeter of its concession. The power generation segment has been opened to competition with EDM being nevertheless the single buyer for power supplied by independent power producers (IPPs) and SOGEM, the operator of the regional OMVS hydropower plants Manantali and Felou. The Malian Agency for Domestic Energy and Rural Electrification Development, AMADER, was created in 2003 to supply electricity to the rural areas through a public private partnership approach whereby rural electrification concessions (outside of EDM’s concession perimeter) are granted to private operators. The Electricity and Water Regulatory Commission, CREE, reporting to the Prime Minister’s office, was established in 2000 to regulate the water and electricity sectors. CREE’s mandate is however limited to EDM’s concession perimeter and AMADER is de facto regulating the electricity service in the rural areas.

Despite significant progress over the last decade, access to modern energy services remains low in Mali at about 30 percent, corresponding to an access rate of 55 percent in urban areas and 18 percent in rural areas. Currently, the total domestic installed generation capacity connected to the grid stands at 456 MW (including Mali’s share of regional hydropower generation capacity) while the import capacity stands at 65 MW. Additionally, isolated centers in areas located far away from the grid are being served with standalone thermal generation units totaling an installed capacity of 57 MW. Overall generation and imports in 2015 reached 1,595 GWh on the grid, 48 percent of which came from four hydropower plants including two plants from the regional OMVS system (Manantali and Felou). Over the past ten years, only thermal generation (HFO or diesel) capacity has been added to the national grid, with its proportion growing from 10% of the total energy mix in 2005 to 37% in 2015. This project will contribute to rebalancing the country’s energy mix towards cheaper and cleaner sources of energy by adding additional hydropower capacity to the national grid.

The performance of the electricity network has sharply declined since 2011. The availability of the generation facilities has declined mainly due to major maintenance works at the Manantali hydropower plant and lack of maintenance of the existing generation facilities. Moreover, on the transmission and distribution side, the technical losses have increased from 20% in 2011 to close to 23% in 2015, mainly due to the lack of investments in the rehabilitation of the network. On the
other hand, EDM’s customer base has increased rapidly from 120,000 to close to 400,000 in the past twelve years, with the demand growing at a compounded annual growth rate (CAGR) of 10 percent. To serve the fast growing demand for electricity, EDM has to rely on expensive rental containerized diesel units (from Aggreko and APR) which is expected to reach an aggregated installed capacity of 98MW in 2016, i.e. 27% of the grid-connected capacity.

As a result of the sector’s weak performance and financial challenges, the Government developed a recovery plan in 2013 to improve the operational and financial performance and eliminate subsidies by 2018, which is unlikely to be met. The GoM has more recently initiated a new reform aimed at addressing the persistent challenges that the sector is facing. The World Bank is assisting the GoM in expanding its transmission and distribution network as well as electricity access, particularly in rural areas, through policy advice, technical assistance and investment project financing. The ongoing Mali Energy Sector Support Project (P108440) aims at improving the access and efficiency of electricity services in Bamako and in other targeted (grid connected) areas in the country. The other ongoing Rural Electrification Hybrid Systems Project (P131084) aims at expanding access to modern energy services in rural (non-grid connected) areas of the country and to increase renewable energy generation in target areas. There are a number of power sector operations in the pipeline for Mali: (i) the Kenie hydropower project (P160166); (ii) the regional OMVS transmission expansion project (P147921); and (iii) the regional Banda gas to power generation project (P145664). Looking forward, the Bank is also considering a Development Policy Operation (DPO) series combined with new IPF operations to support the GoM’s reform agenda of the energy sector in Mali.

Senegal’s energy sector is dominated by SENELEC, the state-owned utility that has a monopoly for transmission, distribution and energy purchase in most of the country. SENELEC owns about half of the country’s generation capacity, with the remainder being owned by independent power producers (IPPs) that generate electricity and sell it exclusively to the utility. A rural concession model was introduced to attract private concessionaires (Concessionaires Electricité Rurale) in areas not covered by SENELEC, and 6 have already been granted to private operators. These concessionaires have the monopoly for electricity transmission and distribution within their concessions. The sector policy is overseen by the Ministry of Energy and Development of Renewable Energies. An independent Electricity Regulatory Commission (Commission de Régulation du Secteur de l’Electricité, CRSE) was established in 1998 with the responsibility of approving revenue requirements for the sector and overall regulation, including regulating CER’s tariff and licensing and leading IPP tender processes.

Senegal has one of the best overall access rates to electricity in Sub-Saharan Africa, but electricity supply is expensive, often unreliable, and access remains limited in rural areas. The available installed capacity stands at 718 MW in 2016. Demand is however growing faster than supply mainly due to the sector’s financial challenges and the limited success in planning and implementing new generation projects. The current access rate in Senegal is relatively high by regional standards, at 57 percent of households, but rural access remains low at 29 percent, hindered by inadequate infrastructures and high tariffs. As the country relies mostly on expensive imported fossil fuels for power generation, the average electricity cost in 2016 was estimated at US$0.22 per kWh. Such high electricity costs are unaffordable for many households, and represent therefore a major barrier to the goal of universal access to electricity. Furthermore, electricity supply remains unreliable. Despite ongoing reforms, customers report poor reliability, with an average of six
outages per month averaging 1.8 hours. And overall losses and unserved energy (a proxy for blackouts and brownouts) are still high -- about 20 percent and 37.3 GWh per year in December 2015 -- compared to the country’s targets of 17 percent and 10 GWh per year.

The Government of Senegal is implementing a sector strategy to phase out subsidies through diversification of the energy mix, increased revenues, and improvement of the efficiency of service delivery. The World Bank is assisting the Government’s efforts to improve the operational and financial performance of electricity transmission and distribution, including advisory services to support the reform of SENELEC through the Senegal Electricity Sector Support Project (P125565) and technical assistance to improve the institutional performance of rural electrification through a Sustainable Energy for All (SE4All) Bank-executed trust fund. The Bank is also considering a DPO for Senegal focusing on lowering the cost of energy through cheaper generation mix and better governance and management of the power sector. Finally, the Bank Group is working with Government to prepare a support package for a quick, transparent tender process for the development of 100 MW of solar IPPs in the context of the Bank Group Scaling Solar Program.

Among the three countries, access to modern energy services is the lowest in Mauritania at about 22 percent. SOMELEC, the state-owned utility, is responsible for the generation, transport, distribution, and sale of electricity in the country’s urban and suburban areas. Electricity consumption is increasing by more than 10 percent per year, yet less than five percent of the rural population has access to electricity. The main resource used in the country for electricity production is heavy fuel oil (HFO), which accounts for 70 percent of the installed generation capacity (just over 170 MW total). The average electricity tariff stood at US$0.22 per kWh while the average supply cost stood around US$0.32 per kWh in 2014. The Banda Gas Project, aimed at developing indigenous natural gas resources and being supported by the World Bank Group, will be key to reducing energy costs in Mauritania.

From a regional perspective, the WAPP Master Plan has identified two critical links to increase the wheeling capacity of RIMA and to integrate it to the WAPP. Taking into account the new generation facilities in Mauritania (Banda Gas) and Mali (Gouina and Albatros), and the potential benefits from electricity trade, the Master plan has identified two new lines: (i) the Manantali-Kita-Kati line, and (ii) the Kayes-Tamboacounda line. Acknowledging the fact that the existing Manantali-Bamako line is becoming a bottleneck in the power transmission system from the main generation area (Manantali) to the main consumption area in Mali (Bamako). SOGEM, with financing provided by the AFD, is in the process of implementing the Manantali-Kita-Kati line. On the other hand, the existing Kayes-Dagana (Senegal) line will also very soon become overloaded, as it is transmitting all the energy being produced in the Kayes area towards Senegal and Mauritania. The proposed Kayes-Tambacounda line will therefore release some load from the Kayes-Dagana line by providing an additional connection to Tambacounda where it will be connected to the 225 kV OMVG system under implementation and partly being financed by the World Bank. The OMVG system will link Senegal to Guinea, providing access to its extensive hydropower potential at low cost, while also connecting the Casamance and Senegal Oriental regions to the national grid. With the completion of this projects, the OMVS countries will be able to expand trade inside RIMA and in a larger scale with the WAPP system.

With the completion of the Cote d’Ivoire-Liberia-Sierra Leone-Guinea (CLSG) interconnector, the OMVG interconnector, and the proposed project, the WAPP will become a unified power grid.
Much progress has been made on developing the WAPP transmission backbone with many interconnections being finalized or under construction. Once the CLSG interconnector is completed, the networks of Guinea will be connected to the Southern Backbone of Ivory Coast-Togo-Benin-Nigeria. At the same time, once the OMVG project is completed, Senegal, The Gambia, Guinea Bissau, and Guinea will be integrated into one unified system (See Figure 1 Annex 2). The line proposed under this project will reinforce the existing connection within RIMA and connect the OMVG and OMVS systems, which will provide reliability, flexibility, and redundancy to the exchanges between networks within the WAPP.

II. Proposed Development Objectives
The project development objective is to enhance electricity trade between Mali, Mauritania, and Senegal

III. Project Description

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V. Implementation
The project will be implanted under the legal framework established by the Convention Establishing the OMVS, the Convention of Financing of Common Works, and the Convention Creating SOGEM adopted and ratified by the Governments of Mali, Mauritania and Senegal. According to those treaties, SOGEM is the implementation agency for the works financed under this project. SOGEM is a special purpose company in charge of the operation and maintenance of the RIMA’s power generation and transmission assets defined and financed as common works. SOGEM is a public company whose shares are equally owned by three OMVS member countries, Mali, Mauritania, and Senegal.

SOGEM will be responsible for detailed planning and scheduling of project implementation arrangements, for preparing and issuing bidding documents, and for conducting the bid evaluation and contract award processes. Although SOGEM has experience with the implementation of Bank
financed energy projects such as the OMVS Felou Hydroelectric Project (P099312), its capacity is stretched given the ongoing major rehabilitation works at Manantali. SOGEM’s capacity remains limited and as such, an Owner’s Engineer will be recruited to assist the company with overseeing and monitoring project implementation. SOGEM will also benefit from technical assistance under Component 2.

A Project Management Unit will be established under SOGEM. The PMU will be responsible for: (i) coordination and planning of the works; (ii) supervision and monitoring/control of the project activities; (iii) administrative and financial management; (iv) procurement activities; (v) implementation of safeguards measures; (vi) performing secretariat duties of the monitoring and advisory committee; and (vii) reporting on progress to donors and other relevant stakeholders.

The OMVS has created a new company SEMAF, subsidiary of SOGEM, to operate the OMVS power system including the current project. SOGEM has adopted institutional changes in relation to the operation and maintenance of its plants. The operation and maintenance of Manantali was outsourced to ESKOM Energie Manantali (EEM) between 2002 and June 2014. SEMAF, an interim subsidiary of SOGEM, was established in July 2014 to take over the role of system operator for an interim period of four years while the process is launched for the recruitment of a new operator pursuant to the expiration of the former operation contract with ESKOM. SEMAF has currently 140 staff, out of which almost 70 are officers, 50 are technicians and 20 are unskilled workers. Once the infrastructure financed under the project is commissioned and the network transitions from construction to operation, the infrastructure will be operated and maintained by SEMAF.

VI. Safeguard Policies (including public consultation)

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Comments (optional)

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