

## PROJECT INFORMATION DOCUMENT (PID) CONCEPT STAGE

Report No.: AB1981

<b>Project Name</b>	WAPP APL 2 - Felou Regional Hydropower Project
<b>Region</b>	AFRICA
<b>Sector</b>	Power (50%); Renewable Energy (50%)
<b>Project ID</b>	P094916
<b>Borrower(s)</b>	GOVT. OF SENEGAL, MALI, MAURITANIA
<b>Implementing Agency</b>	
<b>Environment Category</b>	[X] A [ ] B [ ] C [ ] FI [ ] TBD (to be determined)
<b>Date PID Prepared</b>	November 21, 2005
<b>Estimated Date of Appraisal Authorization</b>	February 20, 2006
<b>Estimated Date of Board Approval</b>	May 30, 2006

### 1. Key development issues and rationale for Bank involvement

**Regional Overview:** The 15 member states<sup>1</sup> of the Economic Community of West African States (ECOWAS) occupy some five million square kilometers and are currently home to about 250 million people, which is projected to reach 380 million by 2020. Half of the present population lives in poverty, with per capita income barely above US\$300 per year. Despite the region's large energy endowment, the region's per capita consumption of electricity is among the lowest in the world. In 2003, the combined total consumption of electricity was about 40,000 GWh (approx. 160 kWh per capita) and peak power demand was 6,500MW. Electricity demand is projected to grow by over 7% per year until 2020, when electricity requirement would reach 140,000 GWh (approx. 370 kWh per capita) and the peak power demand would exceed 22,000MW. Faced with this power system expansion challenge, ECOWAS Member States have acknowledged 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. They also acknowledge two major shortcomings in the region at the present time: (a) increasing reliance on hydro-based power systems will not provide sufficient regional security of electricity supply, and (b) the lack of adequate transmission infrastructure (within and between national power systems) is the weakest link in the drive towards greater cooperation in power sector development.

**ECOWAS Vision – West Africa Power Pool:** The vision of ECOWAS is to develop and put in place the West Africa Power Pool (WAPP) – *a cooperative power pooling mechanism for integrating national power system operations into a unified regional electricity market* – with the expectation that such mechanism would, over the medium to long term, assure their citizens a stable and reliable electricity supply at affordable costs. The long term scenario is to establish WAPP as the principal vehicle to help meet the region's projected electricity requirement by harnessing electricity from: (a) several large capacity hydropower facilities (Kainji& Jebba, Akosombo, Manantali) sited on the region's major (Niger, Volta, Senegal) rivers which produce relatively low-cost electricity (US\$0.01-0.03/kWh); (b) the substantial but as yet untapped hydro resources of Guinea, some 6000 MW of which is potentially economic to develop and can generate around 20-25 TWh per year of electricity at relatively low cost (between US\$ 0.02-0.3/kWh); and (c) an expansion of gas-fired power generation, leveraging the community's parallel track strategy to expand access to Nigeria's enormous natural gas reserves (3500

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<sup>1</sup> Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo.

billion cubic meters of proven natural gas reserves) via the proposed West Africa Gas Pipeline (WAGP) project. In order to provide a robust infrastructure platform for the WAPP, a four-fold increase in power system interconnection capacity among ECOWAS Member States (the “Community”) is required over the period 2005-2020.

**WAPP Cooperation Framework:** ECOWAS Member States are facing up to the challenge ahead by taking collective action to mobilize financing on a larger scale than has hitherto been forthcoming to establish, *inter alia*, a robust infrastructure platform for the WAPP. They have recognized that a precondition for successful regional energy integration in West Africa is the establishment of a transparent and harmonized policy, regulatory and commercial framework for cross-border electricity trade throughout the Community. Accordingly, the Community’s highest decision-making body – the *Summit of the Heads of State and Government of the ECOWAS Member States* – is pursuing a deliberate, step-by-step approach to forge consensus, put in place the core (legal, regulatory, technical, investment programming) building blocks for the WAPP initiative, so as to provide prospective donors and financiers with clear evidence of the collective ownership by ECOWAS member states. Key policy milestones reached to date include:

- a. the 25<sup>th</sup> *Summit of the Heads of State and Government of the ECOWAS Member States* approved the “Mechanism for Financing the WAPP”;<sup>2</sup>
- b. the 26<sup>th</sup> *Summit of the Heads of State and Government of the ECOWAS Member States* signed the “ECOWAS Energy Protocol” or EEP to set up a unified regional (legal and regulatory) umbrella for energy sector developments in the region; and
- c. the 28<sup>th</sup> *Summit of the Heads of State and Government of the ECOWAS Member States* approved the “ECOWAS Revised Master Plan for the Generation and Transmission of Electrical Energy”.

As a “flagship infrastructure project” of the New Partnership for African Development (NEPAD),<sup>3</sup> the WAPP directly contributes to the broader ECOWAS agenda to establish an open, unified, regional economic space in West Africa. The vision for WAPP is also embodied in the EEP – that of creating a “level playing field” to facilitate the balanced development of diverse energy resources of the ECOWAS Member States for their collective economic benefit, through long-term energy sector co-operation, unimpeded energy transit and increasing cross-border electricity trade. Implementation is entrusted to a **WAPP Steering Committee** composed of the “Meeting of ECOWAS Energy Ministers”, assisted by a **WAPP Project Implementation Committee (PIC)** composed of Chief Executives of the region’s national power utilities.<sup>4</sup> Given the large diversities among power systems of the ECOWAS Member States, the WAPP SC and PIC have drawn up an implementation “road map” which follows a two-track approach:

**Zone A – Benin, Burkina Faso, Côte d’Ivoire, Ghana, Niger, Nigeria and Togo;**  
and

**Zone B - The Gambia, Guinea, Guinea-Bissau, Liberia, Mali, Senegal and Sierra Leone.**

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<sup>2</sup> ECOWAS/ CEDEAO (2001). 25th Session of the Authority of Heads of State and Government. Decisions A/Dec.8/12/01 Relating to the Establishment of a Mechanism of the West African Power Pool (WAPP). Dakar, 20 – 21 December 2001.

<sup>3</sup> NEPAD was established to implement an integrated socio-economic development framework for Africa, and was formally adopted at the 37<sup>th</sup> Summit of the Organisation for African Unity in July 2001.

<sup>4</sup> The Chief Executives of national power utilities of ECOWAS Member States subsequently signed an Inter-Utility Memorandum of Understanding (March 2001).

Over the medium term, the “road map” will guide the development of two distinct but mutually reinforcing cooperative power pooling mechanisms, each of which would combine investments to develop the necessary generation and transmission infrastructure with the introduction of common “rules of practice” covering the institutional, regulatory, technical/operational and commercial pre-requisites for promoting cross-border electricity trade – *WAPP Cooperation Agreements*. Although tailored to specific power system configurations of each zone (see Figure 1 below for the “Zone A” cooperation model), each WAPP Cooperation Agreement will be formulated based on the core principles embodied in the EEP.

Over time, the expectation is that power pooling mechanisms for Zones A and B will converge into a unified, well functioning regional power pooling mechanism – an important pre-condition for the future evolution of cross-border trading arrangements into a unified regional electricity market for West Africa.

### **OMVS 2<sup>nd</sup> Generation Hydropower Projects of WAPP “Zone B”:**

Over the past decade, the Senegal River Basin Authority – *Organisation pour la Mise en Valeur du Fleuve Sénégal* (OMVS) has built a multi-national power system (the OMVS power system) that is well-equipped with a central real-time load dispatching facility and is capable of evacuating low-cost electricity produced from the 200 MW hydropower generation plant (installed at the foot of the Manantali Dam) via an extensive 225 kV transmission system into the main load centers of Mali, Mauritania and Senegal.

The main source of electricity supplied by the OMVS power system derives from the Manantali hydroelectric plant, which receives water from a reservoir capacity of 11,300 million m<sup>3</sup> and can support an average yearly energy output of about 807 GWh. The transmission component of the OMVS power system radiates eastwards towards Bamako, Mali and westwards to Dakar, Senegal and Nouakchott, Mauritania. The Eastern Transmission Segment of the OMVS power system consists of a 306 km long, single-circuit 225 kV transmission line (TL) from the Manantali hydroelectric plant to the Kodialani sub-station (Bamako), with an en-route bulk supply point at Kita; and a 20 km, 150 kV TL built between Kodialani and Sirakoro, where the Eastern segment interconnects with the national power system of *Électricité du Mali* (EDM s.a). The Western Transmission Segment consists of a 945 km long, single-circuit 225 kV TL from the Manantali hydroelectric plant to the Sakal sub-stations (Senegal). Bulk supply points have been established at various locations along the Senegal River, in particular Kayes, Matam, Dagana, and Sakal. From Sakal onwards, the Western transmission segment interconnects with the national system of the *Société Nationale d'Électricité du Sénégal* (SENELEC). At Dagana, a 30 km long, single-circuit 225 kV TL establishes an interconnection with the national system of the *Société Mauritanienne d'Électricité* (SOMELEC).

A comprehensive regional transmission stability study, conducted as part of the *Revised ECOWAS Master Plan for the Generation and Transmission of Electrical Energy*, concluded that the OMVS power system concept, which demonstrates a replicable model for regional cooperation efforts in both water resources management and energy integration, is a good basis from creating a robust power pooling mechanism for WAPP “Zone B” (Figure 1 below). Accordingly, the ECOWAS Secretariat and the OMVS High Commission are working in partnership to accelerate the development of the OMVS 2<sup>nd</sup> generation hydropower projects – new run-of-river hydroelectric plants that are to be installed at the Felou (60 MW) and Gouina (95 MW) sites located downstream of the Manantali hydroelectric plant. Both hydropower projects are considered high-priority WAPP investments which will yield significant benefits to Mali, Mauritania and Senegal in terms of augmenting the supply of low cost electricity supply (combined average yearly energy output of both plants is between 650 to 785 GWH/ year at an estimated cost of US cents 4-5 per kWh) to EDM, SENELEC and SOMELEC and also helping to alleviate widening power supply deficits that have resulted in chronic load shedding across the sub-region.

## **2. Proposed objective(s)**

**WAPP APL:** The goal of West Africa Power Pool (WAPP) is to establish a well-functioning, cooperative, power pooling mechanism for West Africa, as a means to increase access of the citizens of the Economic Community of West African States (ECOWAS) to stable and reliable electricity at affordable costs.

**WAPP APL 2:** The developmental objectives of WAPP APL 2 are to: (a) augment low cost electricity supply to the national power utilities of Mali (EDM), Mauritania (SOMELEC) and Senegal (SENELEC) as a means to alleviate widening power supply deficits that have resulted in chronic load shedding in Senegal River Basin countries (Mali, Mauritania, Senegal); and (b) develop the OMVS power system into a nucleus power pooling mechanism that can be replicated for other sub-regions of WAPP “Zone B”. This developmental objective is to be achieved, *inter alia*, by: (a) implementing the proposed OMVS 2<sup>nd</sup> Generation Hydropower Projects at the Felou and Gouina sites using a Design-Build-Operate-Transfer (DBOT) approach that involves deployment of date-certain, fixed price, performance-based contracts for each plant (see Figure 2 below); and (b) providing institutional restructuring and capacity building support to improve the efficiency and performance of the public-private partnership involving an OMVS-sponsored power asset holding entity (currently the *Société de Gestion de l'Energie de Manantali - SOGEM*) and a private operation and maintenance concessionaire (currently *ESKOM Energie Mali* (EEM). As part of the ongoing restructuring of OMVS institutions<sup>5</sup>, SOGEM is to be transformed into the proposed L’Agence de Gestion du Patrimoine de l’OMVS (AGP-OMVS).

## **3. Preliminary description**

**Lending Instrument:** The WAPP is a “flagship infrastructure project” of the New Partnership for African Development (NEPAD),<sup>6</sup> spearheaded by national power utilities of ECOWAS Member States. The WAPP directly contributes to the broader ECOWAS agenda to establish an open, unified, regional economic space in West Africa and is a vehicle for national power utilities of ECOWAS Member States, to achieve the vision embodied in the EEP – that of creating a "level playing field" to facilitate the balanced development of diverse energy resources of the ECOWAS Member States for their collective economic benefit, through long-term energy sector co-operation, unimpeded energy transit and increasing cross-border electricity trade. On June 30, 2005, the Bank’s Executive Board of Directors endorsed the application of the adjustable program lending (APL) instrument, within the framework of the World Bank’s **Regional Integration Assistance Strategy for West Africa**, as the vehicle for providing IDA credit support to the WAPP initiative. By so doing, the Bank has earmarked substantial IDA resources to put in place a multi-year programmatic framework to help close the financing gap and thereby ensure timely implementation of priority WAPP investments and technical assistance activities of the **Revised ECOWAS Master Plan for the Generation and Transmission of Electrical Energy**. The WAPP APL is designed to provide IDA credit support to prospective borrowers in a flexible, implementation-oriented and results-driven manner – when prospective borrowers have satisfied the policy triggers (country commitments under the EEP) and when individual WAPP priority investments are ready to receive IDA credit support.

This FY06 project (WAPP APL 2 – Férou Hydro-Electric Plant) will provide IDA credits through the Governments of Mali, Mauritania and Senegal to the OMVS High Commission and the designated OMVS-sponsored power asset holding entity - the proposed L’Agence de Gestion du Patrimoine de

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<sup>5</sup> The institutional restructuring of OMVS institutions is being supported by the World Bank through the proposed FY06 Senegal River Basin Multi-purpose Water Resources Development (MWRD) APL 1 operation

<sup>6</sup> NEPAD was established to implement an integrated socio-economic development framework for Africa, and was formally adopted at the 37<sup>th</sup> Summit of the Organisation for African Unity in July 2001.

l'OMVS (AGP-OMVS) – to finance the implementation of the proposed 60 MW Férou Hydro-Electric Plant (Férou HEP). The components of the WAPP APL 2 – Férou HEP are:

### **Component 1: Design-Build-Operate-Transfer (D-B-O-T) Contract for the Férou HEP.**

The site of the proposed 60 MW run-of-the-river Férou HEP is located on the river Senegal about 200 km downstream of the Manantali Dam and 15 km from the Kayes<sup>7</sup> sub-station of the OMVS power system. When operational, the average yearly energy output of the Férou HEP would be in the range of 320-350 GWh (*depending on the operational regime adopted for regulation of the upstream Manantali hydroelectric plant*). A performance-based contract is to be applied – *the entire implementation cycle for the Férou HEP, including operation of the Férou HEP to demonstrate performance for up to two hydrological seasons, will be handled under a single responsibility DBOT contract.*

### **Component 2: Consulting Services – Project Cycle Management and Supervision.**

This component will provide comprehensive project cycle development and supervision assistance, covering consultant services as follows: (a) initially, the consulting firm will assist the OMVS High Commission (Stage 1 contract, currently underway with funding from PPF Q475-0-SE) to perform detailed planning and scheduling of project implementation arrangements, prepare and issue bidding documents for the selection of the DBOT contractor, and assist in conducting the bidding process up until bid evaluation and contract award; and schedule the project, prepare bidding documents, conduct the bidding process up until bid evaluation and contract award; and after the DBOT contract is signed with the AGP-OMVS (b) the consulting firm will re-deploy services (Stage 2 contract) to perform contract management support functions that are necessary to oversee all aspects of the implementation of the DBOT contract up until the successful transfer of the fully operational Férou HEP to the AGP-OMVS.

### **Component 3: Institutional Restructuring and Capacity Building TA.**

This component will provide comprehensive technical assistance and capacity building support to restructure/re-configure the existing public-private partnership between SOGEM and EEM to accommodate the OMVS 2<sup>nd</sup> generation hydropower projects.

## 4. Safeguard policies that might apply

Safeguard Policies Triggered by the Project	Yes	No	TBD
<a href="#">Environmental Assessment (OP/BP/GP 4.01)</a>	[X]	[ ]	
Natural Habitats ( <a href="#">OP/BP 4.04</a> )	[ ]	[ ]	[X]
Pest Management ( <a href="#">OP 4.09</a> )	[ ]	[X]	
Cultural Property ( <a href="#">OPN 11.03</a> , being revised as OP 4.11)	[ ]	[ ]	[X]
Involuntary Resettlement ( <a href="#">OP/BP 4.12</a> )	[ ]	[X]	
Indigenous Peoples ( <a href="#">OD 4.20</a> , being revised as OP 4.10)	[ ]	[X]	
Forests ( <a href="#">OP/BP 4.36</a> )	[ ]	[X]	
Safety of Dams ( <a href="#">OP/BP 4.37</a> )	[X]	[ ]	
Projects in Disputed Areas ( <a href="#">OP/BP/GP 7.60)*</a>	[ ]	[X]	
Projects on International Waterways ( <a href="#">OP/BP/GP 7.50)</a>	[X]	[ ]	

The environmental and social impact assessment studies are underway and expected to be completed in December 2005. There is already a dam/weir structure and a very small (600 kW) hydro plant at Férou. Accordingly, the following are key “design-build” criteria that should minimize environmental impacts

<sup>7</sup> Kayes is a small town located on the banks of the Senegal River (population 86 500 in 2003).

\* By supporting the proposed project, the Bank does not intend to prejudice the final determination of the parties' claims on the disputed areas

under the DBOT approach include: (a) the plan is not to raise the height of the existing dam/weir; (b) straightforward conditions for the civil works; (c) proximity to Kayes and road and rail infrastructure; (d) short distance (3 km) for 225 kV connection to the existing OMVS power substation at Médine, which is about 10 km south-east of Kayes; and (e) the ability of the existing transmission network to accept the entire output from the project without reinforcement. The environmental management plan will detail specific mitigation measures that the DBOT contractor will endeavor to adhere to for the Férou site.

## 5. Tentative financing

Source:	(\$m.)
BORROWER/RECIPIENT	10
INTERNATIONAL DEVELOPMENT ASSOCIATION	75
EXPORT CREDIT (UNIDENTIFIED)	40
Total	110

An estimated \$110 million equivalent is required to finance the investment and technical assistance components of the WAPP APL 2 operation. The indicative financing plan consists of \$60-75 million from the IDA credit for WAPP APL 2, \$40 million from the EIB plus \$10 million from the OMVS (primarily for local costs). The EIB financing is earmarked to finance, in parallel with the IDA credit, an internationally competitively bid sub-contract for the supply of the electro-mechanical equipment for the Felou HEP. The AFD has indicated that, should the need arise, up to Euros 15 million in suppliers' credit from PROPARCO could also be made available to support implementation of the Felou HEP.

## 6. Contact point

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