

**PROJECT INFORMATION DOCUMENT (PID)
APPRAISAL STAGE**

Report No.: AB1450

Project Name	West Africa Power Pool APL 1
Region	AFRICA
Sector	Power (100%)
Project ID	P075994
Borrower(s)	GOVERNMENT OF GHANA
Implementing Agency	Volta River Authority (VRA)
Environment Category	<input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> FI <input type="checkbox"/> TBD (to be determined)
Date PID Prepared	March 10, 2005
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Date of Board Approval	June 28, 2005

1. Country and Sector Background

The 15 member states¹ 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.

The principle goal of ECOWAS is to establish an open, unified, regional economic space in West Africa, through *inter alia* the setting up of regional markets for infrastructure services, including electricity. The community's vision is to develop and put in place a "cooperative power pooling mechanism", expecting that such mechanism would reduce their collective vulnerability to drought-induced power supply disruptions and thereby spur on economic growth and also assure citizens of stable and reliable electricity supply at affordable costs.

The ECOWAS member states are convinced that the West Africa Power Pool – *a cooperative power pooling mechanism for promoting inter-utility cooperation in the planning of investments and operation of interconnected national power systems for the region as a whole* – will help them meet the region's projected electricity requirement by harnessing electricity from several large capacity hydropower facilities (both rehabilitation and new resources), and 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 billion cubic meters of proven natural gas reserves) via the proposed West Africa Gas Pipeline (WAGP) project.

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

A four-fold increase in power system interconnection capacity among ECOWAS member states over the period 2005-2020 is required to provide a robust infrastructure platform for the West Africa Power Pool. Moreover, the community needs to establish a transparent and harmonized policy, regulatory and commercial framework for cross-border electricity trade as a pre-condition to mobilize financing on a larger scale than hitherto for regional energy integration in West Africa.

Building on their experiences in promoting regional energy cooperation, and also the region's limited but significant track record of promoting mutually beneficial cross-border electricity trade arrangements, the "Meeting of Energy Ministers" of ECOWAS member states formulated a proposal to set up the West African Power Pool (WAPP), which was subsequently endorsed by the *ECOWAS Council of Ministers*) and endorsed by the community's highest decision-making body – the *Summit of the Heads of State and Government of the ECOWAS Member States*. The 26th *Summit of the Heads of State and Government of the ECOWAS Member States* signed the ECOWAS Energy Protocol (EEP) to set up a unified regional umbrella for energy sector developments in the region. The 28th *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". The above policy decisions, taken by the community's highest level body, provide clear evidence of ownership by ECOWAS member states of the WAPP initiative.

Ghana's power system, the second largest in the sub-region, is hydropower dominated and two major hydropower facilities– the Akosombo (1062 MW) and Kpong (160 MW) which utilize the very large multi-year storage reservoir in the Volta Lake accounts for over 80% of electricity supply on an average hydrological year. Due to large annual variations in water inflows from the Volta river basin, Ghana's power system has become increasingly energy constrained, requiring the country, in partnership with a private developer (CMS Generation of the USA) to invest in creating large thermal complementation capacity, through the construction of the Takoradi Thermal Power Complex (330 + 330 MW CCGT) and also in the WAGP project as a means to securing comparatively low-cost natural gas from Nigeria. Ghana's existing 161 kV high voltage transmission network is extensive, provides almost nationwide electricity coverage, supports cross-border electricity trade with Benin/Togo (since 1972) and Cote D'Ivoire (since 1984), and has enabled bilateral electricity trade between Cote D'Ivoire and Benin/Togo with third party access. VRA, currently the country's TSO, is strategically positioned to facilitate the expansion of cross-border electricity trade, once it has completed investments that are designed to upgrade the transmission network from 161 kV to 330 kV to improve transfer capacity, reduce losses and facilitate the move to put in place a common "operating rules" under WAPP.

2. Objectives

The key objectives of the WAPP are to establish a well-functioning, cooperative, power pooling mechanism among national power utilities of ECOWAS member states, based on a transparent and harmonized legal, policy, regulatory and commercial framework that would:

- promote cross-border exchange of electricity on risk-free basis;
- assure national power utilities of mutual assistance to avoid a regional power system collapse, or rapid restoration of interconnected regional power;
- reduce collective vulnerability of ECOWAS member states to drought-induced power supply disruptions; and
- increase access of ECOWAS member states to more stable and reliable supply of electricity from lower cost regional sources of (hydro and gas-fired thermal) power generation.

The program contributes to the broader ECOWAS agenda to establish an open, unified, regional economic space in West Africa.

3. Rationale for Bank Involvement

The Regional Integration Assistance Strategy (RIAS) for West Africa, which was presented to the World Bank Board in 2001, is a translation of the World Bank's greater focus on regional integration in Africa. The objective of the RIAS is to help the countries concerned create a more unified regional economic space through the integration of markets of goods, financial and infrastructure services. The envisaged program fits in the framework of the RIAS as it is designed to facilitate cross-border electricity trade and help put in place at the national and regional levels the pre-requisites (infrastructure, institutional, operational, commercial and regulatory) for sustainable implementation of the ECOWAS Energy Protocol. The envisaged Bank lending operation is being designed as the principal vehicle for providing IDA co-financing to physically integrate the power systems of about 10 ECOWAS member states. To achieve this RIAS objective for energy integration among ECOWAS Member States, the Bank and their development partners², in consultation with the WAPP Steering Committee, the WAPP PIC and the ECOWAS Secretariat, have agreed to put in place a multi-year programmatic framework in support of WAPP.

4. Description

The WAPP APL Program will help achieve the medium term goal to establish a robust platform for the future development of a unified regional electricity market, over a long-term (2012-2020) horizon. The components of such platform are being put in place over the medium term (2004-2011) based on the following three (3) distinct but mutually reinforcing infrastructure development projects:

- ③ 330kV WAPP Coastal Transmission Backbone Project, based on an inter-utility cooperation agreement involving the national TSOs of Benin/Togo, Cote d'Ivoire and Nigeria;
- ③ OMVS/OMVG Power System Development Project, to develop the 2nd generation OMVS Felou Regional Hydropower Project and to replicate the OMVS model through the OMVG Kaleta Regional Hydropower Project (incorporating a lightly loaded 225 kV transmission system to interconnect Guinea, Guinea-Bissau, The Gambia and Senegal);
- ③ 225 kV WAPP Inter-Zonal Transmission Hub Project, based on inter-utility cooperation agreement involving the national TSOs of Burkina Faso, Cote d'Ivoire, Mali.

The institutional, regulatory and commercial aspects for each of the above projects will be embodied in WAPP Cooperation Agreements, thereby creating important prerequisites for future transitioning into a unified regional electricity market – a robust platform of mutually compatible agreements between the national power utilities of ECOWAS member states. Accordingly, the WAPP APL program is structured horizontally into three (3) phases.

Under APL 1, the following specific project components are envisaged:

² The following IFIs have indicated an interest in co-financing the WAPP medium term implementation strategy: (African Development Bank (AfDB), the Agence Francaise de Developpement (AFD), the Bank for West Africa (BOAD), the European Investment Bank (EIB), the Kuwaiti Fund for Arab Economic Development (KFAED), the Islamic Development Bank and the Nordic Fund).

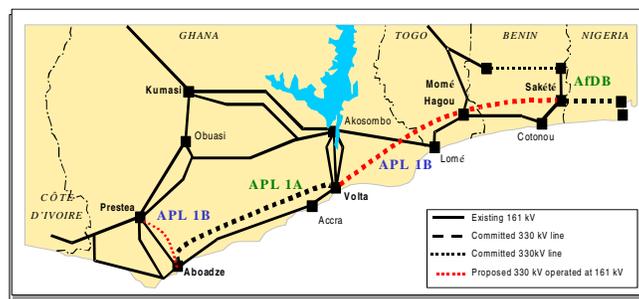
WAPP Institutional Building Component:

- Upgrade the ECOWAS Energy Observatory (Cotonou) into the “WAPP Secretariat and Information Coordination Center” by fully equipping the existing ECOWAS Energy Observatory to perform monitoring and evaluation (M&E) functions for the WAPP APL program in parallel with other critical information exchange functions for the entire WAPP.
- Development of the Environmental Safeguards Framework for WAPP, continuing on the ongoing ECOWAS Secretariat led effort to harmonize environmental impact analysis and resettlement action plan procedures related for WAPP priority investment projects at the regional level.
- Development and implementation by the WAPP Task Force of TSOs (representation by VRA, CEB, CIE and NEPA under the joint oversight of the WAPP Project Implementation Committee and the ECOWAS Secretariat) of a comprehensive “Operational Mitigation and Security Plan” for the 330kV Coastal Transmission Backbone.

WAPP Pre-investment Studies: The first IDA credit tranche of WAPP APL 1 project will finance pre-investment activities (engineering design and preparation of bidding documents, environmental impact and mitigation plans, resettlement action plans) required by VRA and its partner (CEB) to satisfy project triggers for the second IDA credit tranche of the WAPP APL 1 project.

WAPP Infrastructure Components: The target is to complete and put into full operation (by 2009) the entire 330kV Coastal Transmission Backbone infrastructure, in two stages through the WAPP APL 1 project.

Figure 1: The WAPP 330 kV Coastal Transmission Backbone



The IDA credits for WAPP APL 1 project will be made available in two tranches, as follows:

- The first (FY05) IDA credit tranche for the WAPP APL 1 project will finance the construction of the 330 kV line segment from Aboadze to Volta in Ghana, in parallel with the Kuwait Fund for Arab Economic Development (already committed) and the European Investment Bank (under appraisal). Ghana has already met the policy trigger for the first tranche. This particular 330 kV line segment is expected to become operational by 2007.
- The second (FY06) IDA credit tranche of the WAPP APL 1 project will be part of a co-financing package for the remaining segments – the Prestea-Aboadze segment and the Volta-Mome Hagou-Sakete segments. The African Development Bank (AfDB) and the West African Development Bank (BOAD) have indicated their interest to finance the construction of the 330 kV line segment from Volta through Mome Hagou (Togo) to Sakété (Benin), to be operational in 2008. It is expected that the second (FY06) IDA credit tranche for the WAPP APL 1 project will also finance the 330 kV Aboadze – Prestea line segment and the reinforcement of the northern transmission network in Ghana (the VRA’s 161 kV Tumu-Han-Wa Project).

Project Triggers. Before the second (FY06) IDA credit tranche is released, the four beneficiary TSOs must conclude agreements to put in place: (i) the WAPP Cooperation Agreement covering institutional and commercial arrangements for project implementation (**Project Trigger 1**), and (ii) the WAPP Operational Mitigation and Security Plan for the 330kV Coastal Transmission Backbone (**Project Trigger 2**).

5. Financing

Source:	(\$m.)
BORROWER/RECIPIENT	15
INTERNATIONAL DEVELOPMENT ASSOCIATION	100
AFRICAN DEVELOPMENT BANK	25
EC: EUROPEAN INVESTMENT BANK	10
KUWAIT: KUWAIT FUND FOR ARAB ECONOMIC DEVELOPMENT	16.5
Total	166.5

6. Implementation

Partnership arrangements: First and foremost, WAPP is a partnership between the governments of ECOWAS Member States who collectively have resolved to put in place the regional power pooling mechanism as the preferred means to achieve their long term vision – a unified regional electricity market where electricity supply costs are lowered and energy security improved in order to contribute towards further regional energy integration. The ECOWAS Member States are in the process of ratifying the ECOWAS Energy Protocol to provide legal and regulatory framework for all regional energy integration initiatives, including the WAPP and WAGP projects.

Second, WAPP is an emerging partnership whose membership is open to any power (public or private) utility that operates in any ECOWAS Member State. Finally, WAPP is a partnership between the ECOWAS Member States and donors including the World Bank. Financing partners include the Kuwait Fund for Arab Economic Development and the European Investment Bank for APL 1, and for APL 2, the African Development Bank (AfDB), the Bank for West Africa (BOAD) and possibly, the European Union. Bilateral donors include the Agence Francaise de Developpement (AFD) and the United States Agency for International Development (USAID).

Institutional and implementation arrangements: The coordination and implementation arrangements for WAPP activities are comprehensive and involve ECOWAS policy-making and administrative organs, the national and/or multi-national power utilities of ECOWAS Member States and international financial institutions and bilateral donors. The institutional framework includes

- **WAPP Steering Committee (SC)**, established by the Meeting of Energy Ministers, maintains overall oversight of the initiative.
- **WAPP Project Implementation Committee (PIC)**, which comprises the Chief Executives/Director-Generals of all the power utilities of the ECOWAS Member States. The **WAPP Executive Board** to be appointed by a proposed **General Assembly** of WAPP will take over from the PIC, in line with a previous WAPP SC Resolution. The WAPP Executive Board will assume responsibility for the proposed **WAPP Secretariat and Information Coordination Center**, which in turn, is to be set up under the WAPP APL 1 project by upgrading the existing **ECOWAS Energy Observatory**.
- **WAPP Task Force (Transmission System Operators)** which has been established to formulate comprehensive proposals on the “Operating Rules” and “Commercial Rules”.
- **ECOWAS Task Force of Regulators**, which is to be convened to assist in the execution of the **ECOWAS Regional Regulatory Development Project (RRDP)**. The Agence Francaise de Developpement (AFD) is funding the exercise.

The WAPP APL 1 Executing Agency is Ghana’s VRA. VRA’s primary functions are the bulk supply and transmission of electrical energy for large industrial and mining consumers and the two electricity distribution companies in Ghana, one of is the Northern Electricity Department (NED) and ECG. Ghana’s transmission system operator – legally referred to as the Electricity Transmission Utility (ETU) – is currently structured as a functionally un-bundled business unit of VRA. In line with a Government policy directive issued in 1998, VRA registered (in 1999) a wholly owned subsidiary company – the National Grid Company Ltd (GRIDCO) and initiated action to transfer national transmission and load dispatch assets to that subsidiary company.

7. Sustainability

This cluster of ECOWAS Member States (Benin/Togo, Cote d’Ivoire, Ghana and Nigeria) that will implement WAPP APL 1 have already established a significant track record of promoting mutually beneficial cross-border energy trading arrangements in electricity and petroleum products. The WAPP APL 1 project leverages over 25 years of lessons of experience that these countries have gained in establishing and expanding cross-border electricity trade, based on government-to-government bilateral power supply contracts that have typically been executed by national power utilities. Moreover, the WAPP Cooperation Agreement to be put in place will reduce their collective vulnerability to power outages by jointly establishing and implementing a specific “operational mitigation and security plan” for the 330kV Coastal Transmission Backbone.

ECOWAS Member States are fully committed to implement two “flagship projects”, namely for development of the West Africa Gas Pipeline (WAGP) and the WAPP, which will secure the short- and medium-term sustainability of the regional energy integration process in West Africa.

Over the long-term, the key to achieving sustainability of regional energy integration initiatives, such as WAPP, lies in the establishment and strengthening of the emerging power utility-led institutional framework – the WAPP institutional framework (WAPP Secretariat and Information Coordination Center and the network of WAPP Operational Coordination Centers to be set up in Cote d’Ivoire, Ghana, Nigeria and Senegal).

8. Lessons Learned from Past Operations in the Country/Sector

The proposed WAPP APL program has been designed, taking into account broad lessons learned from the five decade long evolution of the best known regional power market – the Nordic power market which is operated by NordPool. In addition, lessons gained from the design of comparable Bank financed regional programs for Southern Africa Power Pool (SAPP APL) and Energy Community of South East Europe (ECSEE APL).

Design of Power Pooling Mechanism. A key lesson learned from NordPool experience is that regional multi-country electricity trading arrangements, such as the one envisioned for WAPP, require active involvement of all transmission system operators. The two most pertinent lessons that apply to the design of the WAPP APL 1 project are:

Lesson One: the key to successful expansion of multi-country, regional electricity trade is to initially establish an appropriate (simple, flexible and robust) institutional structure consisting of the main national power utilities. Over time with growing economies and increases in electricity demand within a regional context, the scope and evolution of multi-country, regional electricity trade expands as trading partners build confidence in working together. With limited interconnections in place among ECOWAS member states and the present reliance on government-to-government power exchange agreements executed by national power utilities, it is prudent to focus on measures that are indispensable pre-conditions for replicating the basic **NORDEL** approach – those would be embodied in the formulation of the **WAPP Cooperation Agreement** for the 330kV Coastal Transmission Backbone, for implementation by the TSOs of Benin/Togo, Cote d’Ivoire, Ghana and Nigeria;

Lesson Two: in order to maintain balance in the transformation of power system operations from a national into a multi-country, regional operations regime required to implement the **WAPP Cooperation Agreement** for the 330kV Coastal Transmission Backbone, it is preferable to promote greater independence for national transmission system operators to coordinate and cooperate with each other across borders.

APL Program Design. The following are three program design lessons of experience gained from the **SAPP APL** (FY04) and **ECSEE APL** (FY05) programs, and applied to the WAPP APL:

Lesson One: the design of policy and/or project specific triggers for the APL program should be grounded in a well-defined policy and institutional framework, have full backing of the beneficiary member states and move at a pace tailored to each member states’ situation. WAPP APL 1 project design is well grounded in the long track record of cross-border power exchange involving Ghana and Benin/Togo;

Lesson Two: stakeholders at both the national and regional levels should have a combined ownership of program implementation arrangements, so as to promote uniformity of purpose;

Lesson Three: the design of APL programs which provide a regional umbrella for multi-faceted, multiple-country infrastructure projects should focus on achievement of regional program goals (and not be diverted by national issues) to ensure their effective implementation.

9. Safeguard Policies (including public consultation)

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

This APL1 for the WAPP project has been categorized as “B” under OP4.01 since it is a transmission line through already developed areas of Ghana with little to no environmental sensitivity, and through which an existing line already runs. In many places, the new line will parallel the existing line. Subsequent APLs under WAPP will be independently categorized under OP4.01. VRA conducted an EA of the project in March 2003. The Environmental Assessment (EA) was reviewed and approved by the Ghanaian Environmental Protection Agency (EPA) who issued an Environmental Permit for the project on 27 February 2004. The EA was disclosed on 24 February 2005 and the Resettlement Action Plan (RAP) was disclosed on 28 February 2005.

In order to facilitate compliance with safeguard procedures across the ECOWAS region in the long run, a process of harmonization of environmental and social rules and regulations is being put in place. The ultimate goal of this effort is to minimize the burden that environmental and social safeguards impose on project development in the energy sector by harmonizing standards and rules and procedures across the region. The tools to achieve this will be the adoption of general safeguard framework documents.

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

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