

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

Report No.: AB4319

Project Name	WAPP APL 3 (1 ST PHASE – INTER-ZONAL TRANSMISSION HUB)
Region	AFRICA
Sector	Power (85%); Technical Assistance (15%)
Project ID	P094919
Borrower(s)	Governments of Republic of Ghana and Republic of Burkina Faso
Implementing Agencies	<i>SONABEL and GRIDCo</i>
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	04/30/2011
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Date of Board Approval	06/28/2011

I. Country Context

Regional Overview

- The 15 member states¹ of the Economic Community of West African States (ECOWAS) cover an area of about 5 million square kilometers with over 260 million people. The region has important energy resources with 1/3 of the African gas and oil reserves and over 23,000MW of technically exploitable hydropower capacity as well as solar resources
- Access to sustainable and affordable energy is one of the main priorities of ECOWAS as a way to alleviate poverty and improve its economies competitiveness. A regional approach to promote an optimal use of energy resources was launched in 1982 by the adoption of an ECOWAS energy policy². This political commitment led later to the setting up of energy programs such as the West African Power Pool (WAPP) in 1999, the West African Gas Pipeline (WAGP) and the common regional energy access program with WAEMU³.
- Important infrastructure development is needed to address the 7 percent average electricity demand growth that will lead to a 22,000MW peak demand for power by 2020. ECOWAS member states have acknowledged that past efforts to achieve national self-sufficiency in electricity supply have been uneconomical and costly. The high cost of establishing and operating power generation and transmission infrastructure is mainly due to: (i) lack of economies of scale in investments with higher costs due to small-sized generation units and bigger reserve margin needs to ensure reliability; (ii) difficult to ensure a cost-effective

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

² Decision A/DEC.3/5/82 relating to the ECOWAS Energy policy

³ Based on the ECOWAS/UEMOA Regional Policy on Access to Energy Services for Populations in Rural and Peri-urban Areas adopted in 2006.

energy mix as most of the countries do not have domestic energy resources and face fuel supply constraints. ECOWAS member states also acknowledge two major shortcomings in the region at the present time: (i) over-reliance on hydro-based power systems that will not provide sufficient regional security of electricity supply because of vagaries of rainfall; and (ii) the lack of sufficient generation capacity and adequate transmission infrastructure (within and between national power systems) which is the major constraint in the process of establishing a sustainable regional electricity market.

4. Therefore the ECOWAS energy strategy is based on the recognition that the differences in energy endowments (e.g. hydropower potential in Guinea, natural gas resources in Ghana Nigeria and Cote d'Ivoire) as well as the imbalances between domestic energy resources and needs constitute the basis of regional energy trade opportunities. In addition, the variations of national daily and seasonal consumption patterns will allow mutual support and optimization of supply cost. This strategy aims to (i) take advantage of the aggregation of different load profiles; (ii) ensure an optimal use of energy resources through large scale generation plants designed to supply multiple countries; and (iii) ensure a cost effective and climate resilient system by balancing the energy mix (thermal/hydro).

Country Context

Burkina Faso

5. Burkina Faso has no significant known fossil fuel resources. Only about 18 percent of the population has access to electricity. Per capita consumption is only 44 kWh. Petroleum products are entirely imported (about 450,000 tons annually) by road at high cost from ports over 1000km away. This handicap has acted as a brake on Burkina's ability to expand access to electricity, since over 90% of electricity production is from liquid fuels. Total generation capacity in Burkina Faso is 256MW which is insufficient to meet peak demand. Imports from Cote d'Ivoire and Ghana (via small cities at the border) are just enough to ensure a precarious equilibrium between demand and supply during non-peak load periods.
6. Despite the completion of the Bobo-Dioulasso-Ouagadougou transmission line which facilitates the transfer of power imported from Cote d'Ivoire to the capital, Burkina still suffers load shedding. This is due mainly to the inability of Cote d'Ivoire to provide the necessary power to Burkina Faso. The recent political crisis has seen a complete interruption in supply to Burkina Faso from time to time. Even after a normalization of economic activity in Cote d'Ivoire, the scope for increased power supply to Burkina Faso from Cote d'Ivoire will be limited, due the under-investment in both gas and power production facilities by the latter and increasing export commitments arising from the upcoming interconnection with Mali. Burkina Faso has therefore been forced to contract 61MW of high cost emergency power rental capacity in 2011 to overcome its supply deficit.

Ghana

7. Ghana's electrification rate is about 60 percent, which is significantly higher than the average of 29 percent for Sub-Saharan Africa. Growing urbanization and the country's relatively robust economic growth has increased the demand for electricity. The growth in demand

combined with insufficient investment in the network improvements in the past, has led to considerable strain on the distribution network especially in densely populated urban areas. Electricity is produced from two main sources — hydro and thermal (oil/gas). Total generation capacity is about 2100 MW of which 1200 MW is hydro. Several new plants currently under construction will raise capacity by 800MW over the next two years. The development of gas transmission and processing facilities to exploit Ghana's own gas reserves will provide additional gas supplies to the power sector from 2013-14. With this relatively low-cost gas/hydro energy mix, it is expected that the proposed Bolgatanga-Ouagadougou transmission line will help to significantly reduce the cost of electricity supply in Burkina and facilitate future unconstrained cross-border electricity exchanges across WAPP zones.

II. Project Development Objectives

8. The PDO is to reduce cost of and improve security of electricity supply to Burkina Faso while increasing Ghana's electricity export capability.

III. Project Description

A. Project components

9. The Inter-Zonal Transmission Hub WAPP APL3 (Phase 1) project will finance the following components of investments and technical assistance:

Component 1: 225 kV Transmission Line between Bolgatanga, Ghana, and Ouagadougou, Burkina Faso (US\$84.2 million; US\$15.6 million financed by IDA).

10. This component involves the construction of a 225 kV transmission line from Bolgatanga in the northern part of Ghana to the capital of Burkina Faso. It includes the following elements:
 - Construction of 210 km of 225 kV transmission line;
 - Construction of a new 225/161 kV substation in Bolgatanga, Ghana;
 - Extension of the 225/90 kV Zagtouli substation and construction of a new 90/33 kV substation in Burkina Faso;
 - Installation of telecommunications systems and SCADA;
 - Implementation of Environmental Management and Resettlement Action Plan and strengthening the management of the Kabore Tambi National Park

Component 2: Reinforcement of the transmission grid in Ghana (US\$6 million; financed by IDA).

11. HV Network reinforcements needed in Ghana to be able to transmit 100MW in the interconnection line and provide n-1 reliability. Given the level of preparation and financing available for the 161 kV reinforcement, it was agreed to finance the following items:
 - A 330/161 kV 200 MVA transformer to be installed in Aboadzé;
 - The preparatory study of the 161kV Atebubu-Tamale line.

Component 3: Electrification of rural localities along the right of way in Burkina (US\$9 million financed by IDA).

12. The shieldwire of the 225kV interconnection line will be used to provide electricity to localities no further than 6km from the right of way. This will benefit about 7000 households in Burkina Faso. This component will finance design and engineering studies as well as works.

Component 4: Supervision/Owner's Engineer (US\$4.2 million financed by IDA).

13. This component will finance a single owner's engineer hired to supervise works in both Ghana and Burkina Faso and ensure proper coordination. The interconnection line bidding documents have been prepared by a consultant funded by EIB. Final versions will be available in May 2011 taking into account utilities' and donors' comments. The owner's engineer will take over from the launching of the procurement process to the commissioning of the facilities. The consultant will assist the two utilities with project management and supervision of design, construction and preparation for operation and maintenance of the investments to be undertaken in Components 1 and 2.

Component 5: Capacity building and institutional support to GRIDCo and SONABEL for project implementation (US\$7.3 million, US\$6.3 million financed by IDA).

14. This component will finance a capacity building program for the concerned utilities in High Voltage Planning, O&M of HV transmission systems, SCADA development, operation and maintenance, commercial transactions, Telecommunications and HV network protection. It will also include the acquisition of Hotwire O&M equipments for the trained staff

IV. Financing

	(\$m.)
Source:	
Borrower/Recipient	
IBRD	
IDA	41.1
Others (specify)	
European Investment Bank	30.9
Agence Francaise de Développement	32.3
SONABEL	4.2
GRIDCO	2.5

Total 111

V. Implementation

15. The Project will be implemented by two different legal entities: GRIDCo and SONABEL. It has been agreed that each entity will set up an Internal Project Implementation Unit (IPIU) with relevant project implementation specialists, responsible for procurement, financial management, project monitoring and coordination with the other implementing entities.

A Joint Implementation Committee (JIC) has been established by the two utilities to coordinate implementation of the entire interconnection project.

16. In addition, a joint GRIDCo/SONABEL procurement committee is being established to conduct the bidding process of the line portions in Ghana and Burkina Faso to ensure an optimal outcome, and mitigate the risk of having an unsuccessful or high-cost bidding outcome for the Ghana portion, should each utility bid out its portion of the line separately. Agreement on the process has been reached by the two utilities. A single Owners' Engineer will oversee the implementation of the entire Project, while bidding documents will be issued in accordance with the guidelines of the country where implementation is to be done and evaluation carried out by the national IPIU.

VI. Safeguard Policies (including public consultation)

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

VII. Contact point at World Bank and Borrower

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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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