

Electricity Sector Integration in West Africa

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Abstract. Regional and global integration initiatives push for more electricity sector integration everywhere in the world, including West Africa. The creation of the West African Power Pool (WAPP) in 2000 and important investments under this new structure in 2006 are concrete actions that will result in a more integrated West African electricity sector. But will this integrated sector be more functional than the previous ones? Will the identified electricity sector problems be solved with the new power pool? This paper analyses how power sector integration is presented by international institutions (the UN Economic Commission for Africa, World Energy Council and World Bank) and identifies three problematic issues with the current integration approach: lack of African ownership, unclear and conflicting reform objectives and uncertainty of integration outcomes.

1. Introduction

1.1 Integration

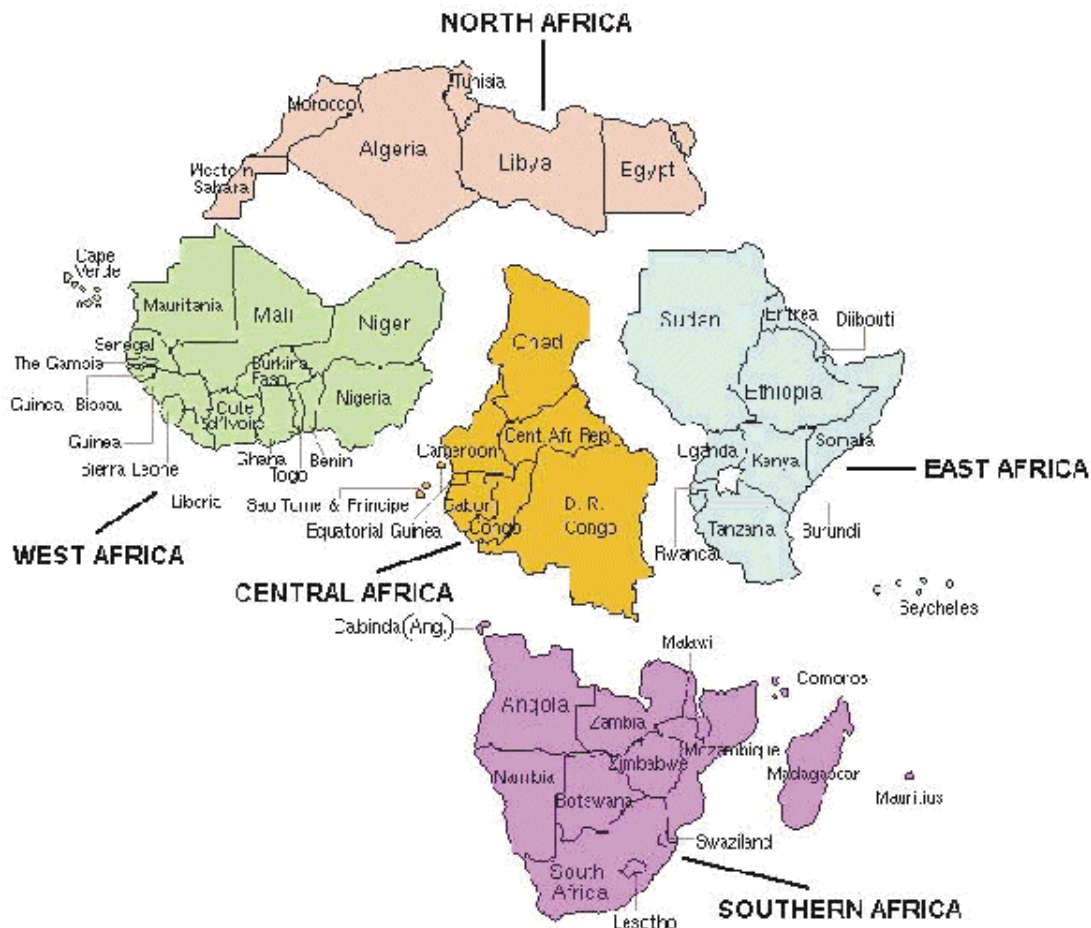
Integration of global and regional economic communities has been a strong trend in the last decades. The European Union, the North America Free Trade Agreement and international trade agreements signed through the World Trade Organization are examples, among many others, of the strength of integration forces. In Africa, the New Partnership for Africa's Development (NEPAD, 2001) sets ambitious integration goals for Africa in various sectors, including energy. Its *Short Term Action Plan Infrastructure* (NEPAD, 2002) promotes integration initiatives in the African energy sector, notably through the West Africa Power Pool (WAPP) and other African power pools. These projects, with the support of major international finance institutions (such as the World Bank) and international donors (such as USAID or the European Union through its EU Africa Partnership on Infrastructure, see EU, 2006) aim at integrating different power systems.

Important preliminary modeling and analysis work has been done by a team of academics from Purdue University, with some USAID funding (Discovery Park, 2007). Among other regions, they modeled the Economic Community of West African States (ECOWAS) region to optimize, as in a centrally planned system, generation and transmission capacity. Results for this region are presented in Sparrow and Bowen (2004), while Sparrow et al. (2005) offers a discussion on other African power pool models: the Southern, Central and East African power pools. These models illustrate how important hydropower projects (such as in the Senegal river basin in West Africa and the Grand Inga project on river Congo, in Central Africa) can benefit all countries, given that the appropriate cooperation and integration steps are realized. However, these assumptions on coordination and capacity to integrate are mostly taken as given in this literature. The institutional capacity of these countries and integration environment are largely ignored, despite playing an important role in the success of integration initiatives. This paper covers these elements, with a specific focus on the WAPP. Section 1 offers an overview of West African countries' electricity sector. The power pool initiative is described in details in section 2. Section 3 analyses how different power pools, and the WAPP in particular, are perceived by three important institutions: United Nations Economic Commission for Africa (UNECA), the World Energy Council (WEC) and the World Bank. Important issues potentially limiting the success of the WAPP are finally identified and discussed.

1.2 The Economic Community of West African States

ECOWAS groups 15 countries since its creation in 1975 (ECOWAS, 2007). Figure 1 shows a map of Africa divided in its five regions, as established in the Abudja Treaty signed in 1991 and creating the African Economic Community (UNECA, 2006:xiii).

Figure 1. African Regional Groups (source: EIA, 1999)



The size of the ECOWAS region is between the European Union (3,892,685 km², 25 member states) and the United States of America (9,158,960 km², 50 states). It can also be compared to its regional neighbor, the Economic Community of Central African States (ECCAS) in terms of GDP, population and area (Table 1). For approximately the same surface, ECOWAS has twice the population and twice the GDP. ECCAS is slightly better off in terms of per capita Gross National Income (GNI), with \$619 against \$615 for ECOWAS.

Table 1. General data on ECOWAS and ECCAS (WDI, 2005)

	Number of countries	GDP (current US\$)	Population	Surface (sq. km)	GNI per capita (current US\$)
ECOWAS	15	160,398,415,200	260,562,710	5,112,510	615.58
ECCAS	11	78,199,768,080	126,226,660	6,666,830	619.52

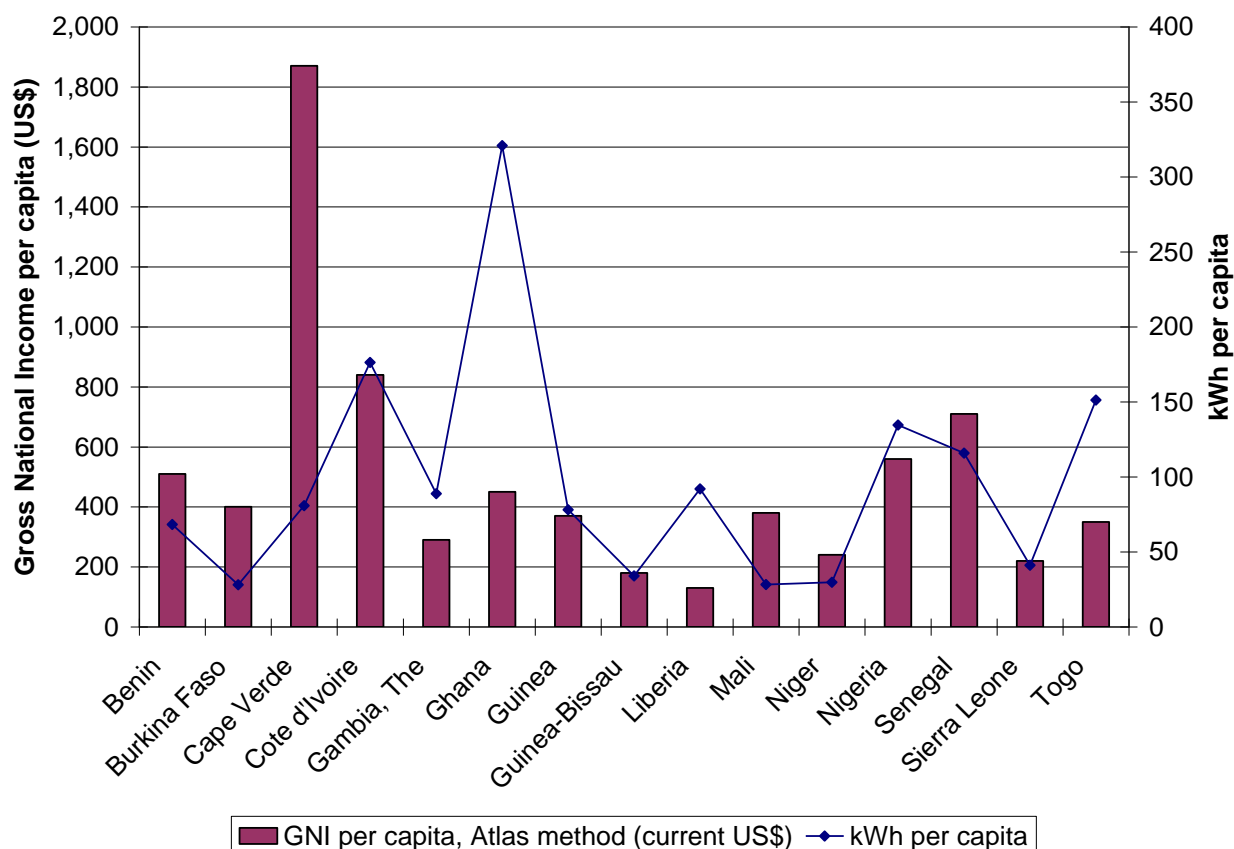
Reflecting the larger population and GDP of ECOWAS, generation capacity is twice as important as in ECCAS, but energy production and consumption are more than twice as important (Table 2). This reveals a more efficient use of the power system in ECOWAS than in ECCAS countries, which can partly be explained by the current interconnected power systems in ECOWAS countries (more on this in section 2). This leads to a higher consumption per capita in the first group of countries: 128 kWh per capita compared to 106 (in 2004). This is about 100 times less than in the USA, with a consumption of 12,331 kWh per capita in 2000 (UNDP, 2003), or 50 times less than Germany or France (with about 6,000 kWh per capita in 2000; UNDP, 2003).

Table 2. General electricity data on ECOWAS and ECCAS (EIA, 2006a)

	Installed Capacity, MW	kW per capita	Generation, TWh	Consumption, TWh	2004 kWh per capita
ECOWAS	9,916	0.0381	34.65	33.52	128.66
ECCAS	4,794	0.0380	15.34	13.49	106.89

There are however important differences among countries within ECOWAS. As Figure 2 shows, per capita income and electricity consumption are barely correlated in ECOWAS countries, with a correlation coefficient of 0.14 (the figure for ECCAS countries is very different, with a correlation coefficient of 0.98). These differences reflect the important local conditions among countries and the difficulty to make general conclusions about energy consumption and income levels.

Figure 2. Income and electricity consumption in ECOWAS Countries (WDI, 2005, for income and EIA, 2006a, for electricity consumption)



1.3 The electricity sector in ECOWAS countries

Only a few published accounts are available on the various electricity reforms attempts in African countries. For instance, on the Senegal case, the failure of the privatization attempt is discussed in Fall and Wamukonya (2003) and World Bank (2005a:13). The Nigeria reform process and situation is presented in Ikeme and Ebohon (2005). Turkson (2000) covers two ECOWAS countries in his book on sub-Saharan power reforms: Cote d'Ivoire and Ghana. The 2001 privatization of the Cameroonian power company has been extensively analyzed and assessed in Pineau (2002), Pineau (2005) and Pineau (2007).

Despite the active promotion of privatization and competition reforms by international financial agencies such as the World Bank, the electricity sectors of ECOWAS countries remain in 2007 highly vertically integrated and under state-ownership. In fact, as shown in Table 3, only two ECOWAS countries (Cape Verde and Cote d'Ivoire) have a power sector owned in majority by (foreign) private companies. In Mali, re-nationalization even occurred in 2005, five years after selling the electricity company to the French company Bouygues (Perez, 2005). Important price

increases along with political and investment problems were at the root of this withdrawal, with shares of the private owner sold to the State of Mali and to Industrial Promotion Services (West Africa), a subsidiary of the *Aga Khan Fund for Economic Development* (AKDN, 2005).

In terms of national sector integration, all countries remain vertically integrated, except for three countries with independent distribution companies: Benin, Ghana and Togo. Only five out of the 15 ECOWAS countries have independent power producers (IPPs): Burkina Faso, Cote d'Ivoire, Ghana, Nigeria and Senegal (Besant-Jones, 2006:22).

Table 3. General and Electricity Sectors Information on ECOWAS countries (WDI, 2005, EIA 2006a and company websites)

<i>Country</i>	<i>Population</i>	<i>GNI per capita, (current US\$)</i>	<i>Capacity (MW)</i>	<i>Generation and Transmission Company and Distribution (D)</i>	<i>Owner</i>	<i>Year of privatization and % of private ownership</i>
Benin	8,438,853	\$510	122	Communauté d'Electricité du Bénin (D: Société Béninoise d'Électricité et d'eau)	State	Projected privatization (distributor)
Burkina Faso	13,227,840	\$400	177	Société Nationale d'Electricité du Burkina	State	
Cape Verde	506,807	\$1,870	7	Electra	Electricidade de Portugal; Águas de Portugal	2000 (51%)
Cote d'Ivoire	18,153,870	\$840	909	Compagnie Ivoirienne d'Electricité; Compagnie Ivoirienne de Production d'Electricité	Bouygues group	(51%)
Gambia, The	1,517,079	\$290	29	National Water and Electricity Company	State	Management contract 2006
Ghana	22,112,800	\$450	1432	Volta River Authority (D: Electricity Company of Ghana Limited)	State	
Guinea	9,402,098	\$370	284	Société d'Electricité de Guinée	State	
Guinea-Bissau	1,586,344	\$180	21	Electricidade e Aguas da Guine-Bissau	State	
Liberia	3,283,267	\$130	253	Liberia Electricity Corporation	State	
Mali	13,518,420	\$380	280	Energie du Mali	State	2000, re-nationalized in 2005
Niger	13,956,980	\$240	105	Société Nigérienne d'Electricité	State	
Nigeria	131,529,700	\$560	5898	Power Company Holding of Nigeria	State	
Senegal	11,658,170	\$710	239	Société Nationale d'Electricité	State	
Sierra Leone	5,525,478	\$220	132	National Power Authority	State	
Togo	6,145,004	\$350	28	Communauté d'Electricité du Bénin (D: Togo Électricité)	State	Management contract 2000 (distribution)

To say the least, privatization and liberalization reforms were not largely embraced in ECOWAS countries. However, as the prevailing economic and institutional situation of these countries has not improved during the 1990s and early 2000s, the following characteristics still describe the sector: “excessive costs, low service quality, poor investment decisions, and lack of innovation in

supplying customers” (Besant-Jones, 2006:10). This contributes to the extremely low electricity usage in these regions, as described previously.

2. The WAPP Integration Initiative

2.1 Power pools

Power pools can take different forms, as studied in UNECA (2004). Table 4 summarizes the four main types, each characterizing a given level of integration. At the low-end of integration are interconnected power systems that are simply synchronized with each other, without any particular coordination or joint optimization of their respective system.¹ Trade is made under long-term power exchange agreements, and additional energy sales only happen in emergency cases. Cost savings are mostly the result of economies of scale in power generation: large projects can sell their output to more consumers, and therefore be more easily viable. Prices are set through negotiations between regulatory authorities.

Loose pools are more integrated because they coordinate dispatch between power systems and allow more short-term exchange to take place. Reserve (capacity margins) can be shared, resulting in additional savings.

In “tight” pools, all power plants are dispatch from a centralized location, according to least production cost principles, under transmission capacity constraints. This dispatching approach can minimize short-run generation costs and therefore be the source of additional cost savings.

Finally, in “new” competitive pool arrangements, a spot market replaces all formal and explicit optimization techniques. Competitive markets are responsible for the dispatch, which should be optimal in the absence of market failures.

Table 4. Types of power pools (UNECA, 2004:27)

	Interconnection	Loose Pool	Tight Pool	“New” Pool
<i>Operational System</i>	Synchronized neighboring utilities	Coordinated dispatch	Centralized dispatch	Independent system operators
<i>Capacity Trades</i>	Bulk power contracts between neighboring utilities	Power purchase agreements & wheeling agreements	Power purchase agreements & wheeling agreements	Forward contracts
<i>Energy Sales</i>	Emergency support	Split savings	Split savings	Spot market
<i>Cost Savings</i>	Economies of scale	Reserve Sharing	Leas-Cost Planning & Merit order dispatch	Competition
<i>Price Setting Mechanism</i>	Tariffs Set by Regulators	Price Caps Set by Regulators	Price Caps Set by Regulators	Market

As we will see in the next sub-sections, the WAPP project is not clearly associated with any of these types of power pool, although it explicitly aims at a more integrated system than the current one.

2.2 The WAPP project

The West Africa Power Pool formally started in “October 2000, [when] 14 ECOWAS members signed an agreement to launch a project to boost power supply in the region” (EIA, 2006b; see also UNECA, 2004:158). Key achievements of the WAPP are the adoption of the *ECOWAS Energy Protocol* (EPP), in 2003, to provide a regional regulatory framework allowing electricity integration and the creation of a secretariat in Abuja, Nigeria (ECOWAS, 2006:6-7; EIA, 2006b). The WAPP

¹ Completely disconnected power systems would of course represent an even lower level of integration.

Secretariat is financed through USAID (World Bank, 2006b:18). Furthermore, the *ECOWAS Energy Observatory*, formally established in 2003 (Plunkett, 2004:6), was transformed in 2006 into the *WAPP Information and Coordination Center* and started its activities the same year in Cotonou (Benin), with funds from USAID (World Bank, 2006a:15; USAID, 2005:5). Its website was partly functioning in February 2007 (WAPP-ICC, 2007). The creation of a *Regional Regulatory Body* is under way, with the opening of two electricity regulatory expert positions to staff the new organization in Abuja (Nigeria). These legal and power system positions were scheduled to be filled in the Fall 2006 (ECOWAS Secretariat, 2006). This new body is funded through a 5 million Euro subsidy form the French Development Agency (AFD, 2006; World Bank, 2006a:43).

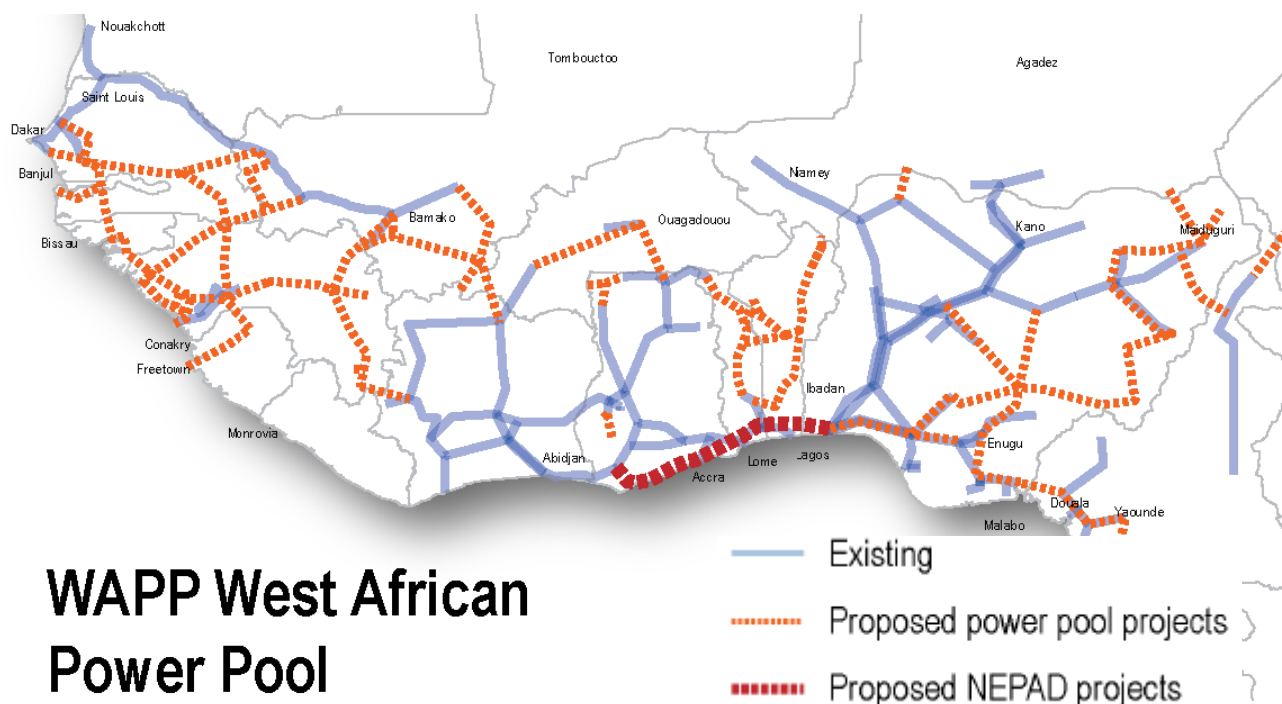
The master plan for the development of the WAPP, discussed in the NEPAD short-term action plan on infrastructure (NEPAD, 2002:138) was finalized by an American consulting company, Nexant (2004a), and presented to the funding agency of the project, USAID, and to the ECOWAS Secretariat. This master plan is based on a thorough technical study of the power sector of WAPP countries, performed by a ten-person “Nexant-Électricité de France (EDF) Project team”, assisted by a three-person “West Africa Counterpart Technical team” (from Ghana, Burkina Faso and Senegal). While the ten-person team was responsible for designing the master plan, the three-person team was responsible for the following activities (Nexant, 2003:5-1):

- 1) facilitate data gathering in their Zones; 2) work and travel with the Nexant experts during field visits to maximize the opportunities for transfer of technology and know-how; 3) participate in the upcoming training programs that Nexant will provide on stability modeling and financial analysis; and 4) participate in the project stakeholder meetings. All of their travel expenses are paid by Nexant.

Following this master plan, 14 priority interconnections have been identified (Nexant, 2004b:4-1). Figure 3 illustrates the existing and proposed interconnections. Given the large territory covered by ECOWAS countries, two zones have been defined:

- **WAPP “Zone A” countries:** Benin, Burkina Faso, Côte d’Ivoire, Ghana, Niger, Nigeria and Togo
- **WAPP “Zone B” countries:** Gambia, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Senegal and Sierra Leone

Figure 3. WAPP Interconnections (source: EU, 2006)



Funding has been found for at least three projects, presented in Table 5.

Table 5. Main WAPP-related projects in ECOWAS countries

Project name	Countries	Lenders (US\$ million)	Sources
<i>Power Sector Development Project</i> (a) Institutional Strengthening and Capacity Building (US\$4.44 million) (b) Extension and Reinforcement of Transmission Lines with Cote d'Ivoire (US\$83.44 million) (c) Additional Thermal Generation Capacity of 14 MW (US\$17.10 million) (d) Demand-Side Management (US\$3.38 million)	(Zone A) Burkina Faso	International Development Association 63.58 Borrower/Recipient 5.76 Danish International Development Assistance 8.41 French Agency for Development 19.86 European Investment Bank 19.86 Nordic Development Fund 12.87 Total = US\$130.34	World Bank (2004)
WAPP Adaptable Program Lending (APL) 1 <i>Coastal Transmission Backbone Project</i> (1) Construction of 330 kV Coastal Transmission Backbone (2) Upgrade of System Control Centers (3) Upgrade of Strategic Power Generation and/or Transmission Assets.	(Zone A) Bénin Ghana Nigeria Togo	International Development Association 100 Borrower/Recipient 39 Kuwait Fund for Arab Economic Dvp. 17.5 European Investment Bank 12 Total = US\$168.58	World Bank (2005b) and (2006a)
WAPP APL 2 <i>OMVS Félou Hydroelectric Project</i> (1) Design-Build Contract for a run of river 59 MW plant (US\$100 million) (2) Two-Stage "Project Cycle Management" Contract. (3) "WAPP Action Plan" for OMVS Power System.	(Zone B) Mali Mauritania Senegal	International Development Association 75 Borrower/Recipient 10 European Investment Bank 40 Total = US\$125	World Bank (2006b)

In these projects, funds are directed at contractors to build power plants and transmission lines, and at technical advisors to schedule loads and power trading. Only marginal investment is made in the information, transparency and regulatory infrastructures. As previously indicated, the information agency, the *WAPP Information and Coordination Center* and the regulatory one, the *Regional Regulatory Body*, rely on subsidies from USAID and the French Development Agency, with uncertain future funding.

2.3 Previous joint development projects in West Africa

WAPP integration initiative started to be officially discussed in NEPAD (2001). However, integration initiatives have already been implemented in the past between ECOWAS countries, some with success, some other with more problems. There also exists a working Southern African Power Pool (SAPP) since 1995, with many interesting characteristics (see for instance UNECA, 2004a:157; UNECA, 2004b:39; WEC, 2005:55-60).

Four significant regional "joint development" projects have already been implemented in West Africa:

1. Zone A – Volta River (Akosombo Dam), involving Ghana, Benin, Togo
 - o Ghana's Volta River Authority (VRA) has been supplying electrical power through the Communauté Electrique du Benin (CEB) to the neighbouring countries of Togo and Benin since December 1972 under an international power exchange Agreement

signed in August 1969 (Akosombo hydroelectric dam) (UNECA, 2004a:156, 2004b:32-34 and World Bank, 2006a:40).

2. Zone A – Bilateral electricity exchange agreements, involving Cote d’Ivoire and neighboring countries: Ghana, Benin-Togo and Burkina Faso
 - **Cote d’Ivoire and Ghana.** Compagnie Ivoirienne d’Electricité (CIE) and its predecessor have been exporting electrical energy to VRA since 1984. Until 1999, bilateral agreements between VRA and CIE were limited to a length of one year. However, since then, VRA and Côte d’Ivoire are committed to longer term energy supply agreements (UNECA, 2004b:32-34).
 - **Cote d’Ivoire and Benin-Togo.** The bilateral agreement signed between CIE and CEB (the bi-national utility of Togo and Benin), came into effect in 1995. Under the terms of this Agreement, CIE has to supply electrical energy for a maximum amount of 200 GWh per year to CEB through Ghana’s transmission network (UNECA, 2004b:32-34).
 - **Cote d’Ivoire and Burkina Faso.** The bilateral agreement between CIE and the Société Nationale Burkinabe d’Electricité (SONABEL) was signed and came into effect in April 2001. Under the terms of this Agreement, CIE has to supply a maximum amount of 100 GWh per year to SONABEL. SONABEL’s imports from CIE reached a total of 66.665 MWh in 2001 (UNECA, 2004b:32-34).
3. Zone A – Joint supply and dispatching between Benin and Togo
 - The 65 megawatt Nangbeto hydroelectric station of the Communauté Electrique du Benin (CEB) between Benin and Togo (UNECA, 2004a:156) was commissioned in 1988 (ADF, 2003:2).
 - A common dispatching center (single decision and centralized command center) for Benin and Togo was considered necessary and a feasibility study was made in 1987. It started operating in 1999, four years behind schedule (ADF, 2003:4-5). The whole dispatching center project was evaluated by the African Development Fund (2003).
4. Zone B – Senegal River Basin (“Manantali hydroelectric project), involving Mali, Mauritania, and Senegal.
 - A 200 megawatt hydroelectric project on the Senegal River basin, under the multinational Senegal River Basin Development Organization (UNECA, 2004a:156).

WAPP projects (presented in Table 5) build on this history of joint development, although the actual project descriptions do not assess nor draw lessons from these experiences (World Bank, 2004, 2006a, b and c).

3. Analysis of electricity sector integration projects

3.1 Methodology

The study of the institutional and integration environment is made through the following research questions: How are integration and electricity sector integration perceived, in terms of problem, objectives, benefits and issues? What are the main challenges facing integration initiatives in the West African electricity sector?

The methodological approach to the analysis of these integration projects combines a content analysis of key documents on energy integration in Africa and an institutional analysis of the energy integration projects. Content analysis is a methodological approach designed to analyze discourse through the study of documents, usually texts, but transcripts of oral documents and visual

documents can also be used (Neuendorf, 2002). Themes of interest are defined by researchers from their interests and from the sample of documents studied. The occurrence of these themes and relationship can be analyzed to learn about their importance, strength, role, or any other aspect. As for any empirical methodology, the choice of the sample and the choice of themes considered (categories or variables) have to be justified, and the analysis has to be transparent and replicable.

The sample of documents reviewed here comes from three international institutions: the UN Economic Commission for Africa (UNECA 2004a, 2004b and 2006), the World Energy Council (WEC 2003 and 2005) and the World Bank (*Project Appraisal Documents on Proposed Credits* for WAPP-related projects; World Bank 2004, 2006a and b). A total of eight documents have been analyzed. These three institutions have been selected for a variety of reasons. First, they have all conducted analysis on energy issues and integration in Africa. Second, they each have a different perspective: the World Bank is a lender and has an important financial influence; the UNECA has a different, more democratic, international legitimacy because of its direct relationship to the UN system; and finally the WEC provides a specific energy industry point of view, as a specialized “multi-energy organization”. Finally, they provide some geographical diversity: the World Bank is located in the Washington D.C. (U.S.A.), the UNECA is located in Addis Ababa (Ethiopia) and the WEC is located in London (U.K.).²

Four broad themes, or categories, related to integration have been defined: “problems”, “objectives”, “benefits” and “issues”. Each document was analyzed to extract words related to these categories. Appendix 1 presents the raw results of this analysis, to ensure transparency. Then, from these results, common sub-themes within each category have been identified and the number of times each of these sub-theme appeared was recorded (Table 6 of next section). These sub-themes have been split in two sub-categories: “global” (when they relate to global integration issues) or “sector specific” (when they relate to electricity sector integration). Results are discussed in the next sub-section.

3.2 Perception of electricity sector integration

Identified problems in Africa, presented to justify integration, are numerous. They relate to both global and sector specific levels. As shown in Table 6, 14 different global sub-themes characterize problems calling for integration, while 12 specific sub-themes describe the electricity sector specific problems. Of particular importance are the general institutional and government problems, followed by economic problems. When it comes to describe the specific problems of the electricity sector, demand and tariffs problems come first (with nine mentions), then technical and managerial problems (5) and finally institutional and environmental ones (2).

In terms of objectives sought by integration, sector specific objectives dominate the eight documents analyzed, with the sub-themes “economy of scale and efficiency”, “security of supply” and “reliability” being mentioned the most often. Improving transmission and trade and creating regional institutions are also high on the list of objectives.

Benefits of integration are more often mentioned as “global” benefits rather than sector specific. The global benefits relate to increased trade, with associated efficiency gains and investment opportunities. On the side specific to the electricity sector, benefits closely match the objectives: increased security, cost reductions (due to economies of scale and efficiency), increased energy supply and reliability.

The number of identified issues is comparable to the number of benefits (13 different themes for issues compared to 14 for benefits), but electricity sector issues are mentioned a high number of

² Some other documents also discuss African integration, such as EU (2006) *Interconnecting Africa: the EU-Africa Partnership on Infrastructure*, or ICSU (2006). The latter presents energy integration as one element of its three priority projects: rural and urban energy access, strengthening and retention of human and institutional capacities, and the development of African energy models and scenarios.

times (total of 32 electricity sector issues). These issues are wide ranging: from technical difficulties to managerial challenges, financial concerns to regulatory ones, with additional national priorities and safety issues that could prevent integration objectives to be achieved.

Table 6. Summary of problems, objectives, benefits and issues of electricity integration
(number between brackets indicates how many times sub-themes were found in documents)

	Global	Sector specific
<i>Problems</i>	Government & Institutions (8)	Demand & Tariffs (9)
Sub-themes:	Institutions (1)	Expensive energy (2)
14 global	Political environment (1)	Unsustainable tariffs (2)
12 specific	Human capital (1)	Lack of energy access (2)
	Bad policies (1)	Low demand (1)
	Lack of political rights (1)	Increasing demand (2)
	Governance (1)	Technical & managerial (5)
	Conflicts (1)	High systems losses (1)
	Loose partnerships (1)	Poor managerial performance (1)
	Economics (7)	Demand inefficiencies (1)
	Income (2)	Diversification (1)
	Poor infrastructure (1)	Lack of transmission capacity (1)
	Lack of openness to trade (1)	Institutional & environmental (2)
	Aid dependency (1)	Government interventionism (1)
	Competitiveness (1)	High environmental impact (1)
	Not diversified economies (1)	
<i>Sub-Total</i>	15	16
<i>Objectives</i>	Strengthen institutions (1)	Economies of scales and efficiency (5)
Sub-themes:	Macro efficiency (1)	Security of supply (5)
2 global		Reliability (4)
8 specific		Facilitate transmission & trade (4)
		Create regional institutions (4)
		Optimize investment (2)
		Reduce project risks (1)
		Improve investment climate (1)
<i>Sub-Total</i>	2	26
<i>Benefits</i>	More trade (5)	Security (4)
Sub-themes:	Increased wealth/efficiency (5)	Cost savings (4)
9 global	More investment (4)	Energy supply (3)
5 specific	More cooperation (3)	Reliability (3)
	More bargaining power (2)	Energy consumption (2)
	More security (2)	
	Induce reforms (2)	
	Environmental quality (2)	
	More competition (1)	
<i>Sub-Total</i>	26	16
<i>Issues</i>	Regional deficiencies (5)	Regional dispatch technical difficulties (8)
Sub-themes:	Institutional endowment (3)	Managerial concerns (6)
7 global	Poor infrastructure (3)	Financial concerns (5)
6 specific	Fiscal revenues and control (2)	Setting regional rules (5)
	Investors' perception (2)	National priorities (4)
	Uncertain benefits (2)	Safety and security (4)
	Trade diversion (1)	
<i>Sub-Total</i>	18	32

What this analysis provides is a picture of the scope of the problems to address, of the variety of targets and potential benefits to reach and of the multitude of issues that may prevent these objectives and benefits to materialize.

With this picture of the situation, the three WAPP project presented in section 2.2 (and Table 5) can be better analyzed. The next sub-section goes a step further by documenting three important issues potentially limiting the realization of integration benefits.

3.3 Analysis of the WAPP projects: underlying issues

From the large sets of issues related to electricity integration and presented in Table 6, three broader underlying issues can be identified from the analysis of the evidence presented so far. These issues are:

1. African ownership of integration projects
2. Clarity of integration objectives
3. Uncertainty of integration outcomes

Issue 1: African ownership

One of the driving principles of NEPAD is to promote African ownership and leadership. As stated in NEPAD (2001:12), “the *New Partnership for Africa’s Development* will be successful only if it is owned by the African peoples united in their diversity”. This link between “ownership” of projects and their success is increasingly recognized; see for instance Khan and Sharama (2003), Kayizzi-Mugerwa (2003) or Tsikata (2003). Ownership in the context of this paper can be linked to a majority of problems identified in Table 6. “Reform ownership”, or “country ownership” of reforms and projects, can be defined in various ways. A simple definition is when the “[reform or project] is similar to what the country would have chosen in the absence of [donors’] involvement” (Khan and Sharama, 2003:235). A more refined definition comes from Kayizzi-Mugerwa (2003:2). Ownership occurs if “policymakers are responsible for the formulation and implementation of their [reforms or projects], [and] apt to defend them before their domestic constituency and donor community”.

Using any of these definitions, concerns over African ownership in these projects are numerous, despite the many West African agreements and loans related to the WAPP. First, it is unclear if WAPP projects would have been chosen without donors’ (and lenders’) involvement. This comes from the fact that these projects have been largely studied and formulated by non-African entities (for example, Purdue University’s Discovery Park, 2007, and Nexant, 2003) and will also be implemented by non-Africans. Indeed, out of the funding secured for ECOWAS projects, the large majority will be spent through “International Competitive Bids” (ICB), where local firms will have little chance to compete against Western energy companies. For instance, of the US\$130 million of the Burkina Faso Power project, US\$110 million (85%) have been spent through ICB (World Bank, 2004:59). The same percentage of the Zone B-WAPP project of US\$125 million will be spent through ICB (World Bank, 2006b:54). When this happens, as illustrated by the composition of the Nexant team and their “West-African counterpart Technical team” (see section 2.2), the role of African experts is limited to marginal tasks.

Second, defending these projects before the local population would be a great challenge in an African context, characterized by low electrification rate: 22.6% in sub-Saharan Africa compared to 72.8% in the world (WEC, 2005:20). Because a large majority of the population will not see any direct benefit in these integration projects (providing more/cheaper energy to those already connected), they are likely to appear irrelevant for the majority of the population. Furthermore, as they are planned over 16 years (Nextan, 2004a:1-1), the long term benefits will largely be heavily discounted by the population, which has a low life expectancy: 46.1 years in sub-Saharan Africa compared to 67.3 for the world (UNDP, 2006:286). Low electrification rates and life expectancies consequently make these integration projects difficult to “own” for the majority of the population, which sees many of its short-term energy needs unaddressed.³

³ For instance, in Burkina Faso, one of the problems is the access to electricity for rural and peri-urban populations (World Bank, 2004:5-6). Funding for an Energy Access Project (EAP) was announced in 2004 for 2006, but nothing was decided on this project in 2007: the EAP was not a World Bank active project in 2007.

Thirdly, “ownership should imply that, when citizens are dissatisfied with public policy, they are able to hold the government accountable” (Kayizzi-Mugerwa, 2003:3). Despite democratic progresses in West Africa, accountability of governments to their citizens (and to the international community) is still unsatisfactory. Even if there could be ownership by project promoters despite accountability issues (in theory), accountability would provide some evidence of ownership, in a context where evidence is very thin.

Finally, when lenders play a very important part in projects, a well known principal-agent problem appears. Agents in this case are the different West African governments (see Khan and Sharama, 2003:232), while principals are lenders. Agents have an incentive to obtain the loan, when principals first motivation is to see improvements in the energy situation. Due to information asymmetry, it is hard for principals to follow all agents’ progresses, and the situation is made even more complex by the fact that there are multiple agents (those negotiating loans are not the same as those in charge of supervising projects), and by the fact that success requires collaboration between different agents from different countries involved in the integration projects. For these reasons, many agents in West Africa do not feel a strong ownership of these projects – they simply feel being “agents” with diffuse responsibilities. And as a matter of fact, WAPP projects funding is overwhelmingly non-African (as detailed in Table 5, less than a combined 13% of the funding comes from borrower/recipient in the funding of the three projects). This allows agents to feel less involved than if their own resources were at stake. In contrast, investment in the South African Power Pool is self-financed in much higher proportions (WEC; 2005:63):

US\$15 billion of new investment is required by 2006, [...] 27% will be self financed and the rest should be secured from the private sector, the World Bank and other development agencies.

Ownership of the successful South African Power Pool was much greater for this reason. Also, as opposed to the WAPP, it can count on an African champion, Eskom, the state-owned South African electricity company (WEC, 2006:61). Illustrating this lack of ownership in West Africa, beyond discourses, official agreements and loan acceptance, Plunkett (2004:5) reports that “action at the national level has been slow, if not glacial” in these integration projects.

Issue 2: Clarity of integration objectives

The second issue related to electricity integration is the clarity of objectives. The number of objectives identified in Table 6 of section 3.2 may be itself problematic, but of even more concern are the following elements: What type of power pool is the WAPP supposed to be? What model should it follow? What part should competition and privatization play in the electricity reforms?

If one integration document (UNECA, 2004b) clearly describes different types of power pool (as presented in section 2.1 and Table 4), WAPP official documents and World Bank project appraisal documents remain unclear on the type of power pool that is considered. There are however some hints that the objective is to make of the WAPP a “new” competitive pool, to replicate the Nordic power market’s experience, as this sentence from World Bank (2005:12) illustrates:

It is prudent to focus on measures that are indispensable pre-conditions for replicating the basic power pooling mechanism that was pioneered by NORDEL.

These main measure, as identified by World Bank (2005:12, 2006a:13 and 2006b:14) involves a set of independent transmission operators:

A key lesson learned from the Nordic experience is that regional multi-country power pooling arrangements, such as the one envisioned for WAPP, require active involvement of all transmission system operators (TSOs). In the Nordic power market, NORDEL, an association comprising the TSOs of Norway, Sweden and Finland initially put in place a robust cooperative mechanism as a means to create a secure and reliable platform for the progressive development of the increasingly unified and competitive regional electricity market that is now operated by NordPool.

If NORDEL is used as a reference for the WAPP, then there are reasons to doubt that a working WAPP will exist in a foreseeable future. The institutional endowment levels of Nordic countries and of ECOWAS countries are so different that NORDEL’s “key lesson” is unlikely to have much

validity in the West African context. No other region in the world has replicated the NORDEL experience, which led to the most integrated electricity market in the world (see Pineau et al., 2004, for a comparison of multi-country electricity markets). North America and Europe, which are regions with more comparable institutions, are still trying to integrate their electricity sectors (with starting institutions such as *Regional Transmission Organizations* in North America and the *European Transmission System Operators*, ETSO). Furthermore, as seen in section 1.3, ECOWAS countries have no independent TSOs and, as document in Table 6, they have a lot of technical and managerial problems with their own specific power systems. The current integration projects aim at increasing the size of the power system, but they cannot count on reliable sub-systems.

More specific short-term objectives directly improving current companies and already existing bi-lateral power exchange agreements should be set. Only after local improvements are secured should the next steps of creating a loose power pool (the second integration step, as presented in Table 4) be considered. This view is supported by another key lesson that “power market reform must be adapted to starting conditions”, as established by Besant-Jones (2006).

Competition and privatization are also explicit objectives of international financial institutions. Indeed, all decisions of the World Bank’s main agency, the International Bank for Reconstruction and Development (IBRD) “shall be guided” by the promotion of private foreign investment (IBRD, 1989: article I.ii). The African Development Fund also considers that the fact that companies are run as state entities is unsatisfactory (ADF, 2003:ix). Competition is also at the core of the “general case for reforms” made by these institutions (Besant-Jones, 2006:10-11). Although it is increasingly acknowledged that competition is not always possible, it remains with privatization one of the main objectives of reforms, coming before transparent regulation and even the existence of competent regulatory bodies. See for example Besant-Jones (2006:11), where competition comes before transparent economic regulation; or Pineau (2005), illustrating the fact that privatization and the possibility of competition came before the existence of an effective and transparent regulator, in the context of the World Bank-led electricity reform in Cameroon.

However, despite this official position on privatization and competition, states remain majority owners in almost all ECOWAS countries, as seen in section 1.3, and electricity companies are highly vertically integrated, leaving little room for competition. No sign of privatization or vertical de-integration is seen in WAPP projects; which is at odd with most international financial institutions’ recommendations.

Furthermore, in terms of competition, power pools are no guarantee that there will be more of it. Power pools of the three first types (in Table 4) do not display higher level of competition than the current power systems (only “new” pools, with a spot market, display direct competition features). Many power pools act simply as coordinating institutions, without promoting competition among their members. For instance, in the United States, the Southwest Power Pool (SPP) was created in 1941 and is responsible for reliability coordination, regional scheduling and expansion planning among eight American states (SPP, 2006). Only one of these states is considered to have a competitive electricity market: Texas. The seven others had no major reform and the structure of the electricity sector is still integrated with regulated tariffs. In terms of ownership, power companies in the SPP are either private, municipally-owned or cooperatives. The SPP has neither induced more competition or private ownership, but has increased efficiency because it can rely on the right cooperation climate, institutional endowment and competent staff (about 245 professionals, SPP, 2006).

Privatization and competition pressures can actually be conflicting with the WAPP integration objectives. Alignment of different reform efforts and objectives is essential if countries and influential stakeholder are to work effectively towards a successful integration, delivering sustainable benefits. As seen here, there is an important lack of clarity in the power pool’s structure and connection with competition and privatization reforms.

Issue 3: Uncertainty of integration outcomes

Besant-Jones (2006:2) declares that “few developing countries can contemplate the technically sophisticated power market reforms”. Theoretical gain of integration projects have been established based on power pool modeling work and an extensive technical master plan (Nexant, 2004a). But these non-African technical analyses do not take into account the absence of local capacity to plan and operate larger networks, nor the many political and social issues characterizing the electricity sector.

Possibly the main concern, already identified in Table 6 is the “national priority” issue that could prevent national companies to export cheaper power to other countries, because supply is still very limited in all countries. Furthermore, export opportunities exist because of price differentials that usually have the consequence of raising the local price in the exporting country, creating a different distribution of income. In the past, income divergence linked to integration created problems (UNECA, 2004a:13):

The East African Community shows that regional integration arrangements can lead to income divergence, with comparative advantages and agglomeration effects concentrating manufacturing in Kenya at the expense of Tanzania and Uganda, leading the community to dissolve in 1977.

It could also be that price convergence becomes a source of frustration, in countries with more abundant and relatively cheaper electricity. It is unclear how acceptable integration outcomes would be in the various ECOWAS countries.

In addition, the current approach to technical and institutional capacity building does not provide the background for a strong electricity to take off. An illustration of this is the US\$4.4 million dedicated to “Capacity Building” in the first WAPP project presented in Table 5. The larger share of this relatively low amount (in a US\$130 million project) was spent on a transitory coordination body, the UER (“Unité d’exécution de la réforme du secteur de l’énergie”, the *Project Coordination unit*, World Bank, 2004:48). By design, this body cannot directly address any of the technical and managerial problems of the local company (SONABEL) because it is there to help finding market solutions and private partners.

Even among the new WAPP institutions (funded with donor’s money, as documented in section 2.2), political problems can be anticipated. The *WAPP Information and Coordination Center* is located in Cotonou (Benin, officially French speaking), while the *Regional Regulatory Body* is sited in Abudja (Nigeria, officially English speaking, richer and twelve times bigger—see Table 3). As documented by the African Development Fund, recent institutional development objectives between Benin and Togo failed to materialize in the context of their dispatching center (ADF, 2003:8):

The CEB in its capacity as the executing agency and loan beneficiary [for the dispatching center] should have been able to restructure and equip itself with its own resources and a moral personality. On completion and during evaluation, most of the relevant provisions set forth in the appraisal report were yet to materialize. The project did not have the expected institutional development impact.

When the past experience has been inconclusive between two relatively small, French speaking countries, such as Benin and Togo, one can only wonder how strong institutional ties and coordination will result out of the new West African institutions operating in two countries as different as Nigeria and Benin.

The integration outcome is further jeopardized by the increased complexity and operational costs of the new system. Larger power systems have indeed financial and technical implications of a higher order: the new technical complexity of the network makes it more costly to operate, as explained by Hammond (2006:678). Consequently, actual improvements will be unlikely to happen. Non-direct stakeholders doubt that the starting conditions are present to implement working power pools. For instance, Niyimbona (2005) points out that that

power pools can be made operational only in regions with (1) fairly developed grid interconnections; (2) adequate generating capacity to meet demand of the pool; (3) a legal framework for cross-border electricity

exchanges; (4) trust and mutual confidence among pool members; and (5) regional regulation and mechanism for dispute resolution. Most of the sub-Saharan African power pools do not meet these requirements.

Given this set of issues outcomes are highly uncertain. Reducing this uncertainty should be a preliminary step of the integration process.

3.4 Recommendations

Given the low African ownership of these integration projects, unclear objectives and strong uncertainties on actual integration outcomes, there is a need to redirect integration efforts towards a more consistent approach. The following recommendations present three suggestions to address the identified issues:

1. ***Increase African ownership.*** To be aligned with NEPAD goals, African ownership of integration projects should be clearly demonstrated. Current projects show minimal financial and human African involvement and are therefore unlikely to result in a strong sense of ownership and pride in the West African population. As African ownership has been defined to be a core principle by NEPAD, projects should not be done unless they demonstrate a strong local participation. More specific suggestions of possible initiatives to foster greater ownership can be found in Khan and Shara (2003).
2. ***Clarify and scale down integration objectives.*** The “power pool” terminology is too ambiguous and doesn’t reflect the current possibilities in West Africa. Local technical and managerial improvements of power companies and of existing bi-lateral projects should materialize before more ambitious regional goals are set. The credibility of already weak institutions will not increase if new, largely empty, institutional shells are created, such as the WAPP Information and Coordination Center and the regional regulatory body. As long as individual countries have problems coordinating and regulating their own power sector, it is unlikely that they will be able to jointly coordinate and regulate their common power sector.
3. ***Investment in institutional and managerial capacity.*** Comparable shares of resources should be dedicated to institutional and managerial capacities as opposed to physical projects. Current projects overwhelmingly focus on power plants and transmission lines, while a general consensus exists on the fact that human and institutional failures are as much problematic as technical ones.

4. Conclusion

The West African Power Pool is a power sector integration initiative backed by many international institutions and by African leaders through NEPAD. Given the potential technical gains and economies of scale accessible through integrated power systems, there are strong arguments in favor of interconnecting West African countries. The problems, objectives, benefits and issues characterizing the integration of different power sectors in Africa are however wide and multidimensional. This was established through an analysis of documents from the UNECA, WEC and World Bank. In this general context, when the three larger WAPP projects funded by a group of international financial and aid institutions are analyzed, three important issues appear. First, African ownership, a core principle of NEPAD, is largely absent. Second, there are no clear objectives set for the WAPP, in terms of the type of power pool it should be and how the integration initiative should relate to privatization and competition reforms. Third, given the weak institutional endowment of West African countries, low investment in capacity building and problematic history of cooperation, positive outcomes are highly uncertain. Three main recommendations are made to remedy the situation. The first one is to set a higher level of African involvement in the integration reforms, both in terms of financing and human participation, in order to increase the chance that a responsible, accountable and sustainable use of the integrated power system will be observed in the future. The second recommendation is to clarify and scale down the integration objectives, in order

to set a more coherent and realistic agenda for power reforms in West Africa. Finally, the third recommendation is to invest comparable shares of resources in human and physical capacities. Financial resources are now almost exclusively dedicated to physical projects (power plants and transmission lines), when institutional and managerial weaknesses are universally recognized.

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Appendix 1: Content of analyzed documents

<i>Document</i>	<i>Identified Problem</i>	<i>Stated Objective</i>	<i>Expected Benefit</i>	<i>Identified Issues</i>
UNECA (2004a) <i>Assessing Regional Integration in Africa</i>	<p>Generic problems of countries (page 21)</p> <p>Income Institutions Political environment Human capital Bad policies Poor infrastructure Lack of political rights Lack of openness to trade Aid dependency Governance Conflicts Competitiveness Not diversified economies Loose partnerships</p>	<p>Specific energy integration objective (page 155)</p> <p>Energy pooling and cross-border energy flows to minimize the cost of supply through economies of scale and to enhance the security and reliability of supply.</p>	<p>Generic benefit of integration (page 10-11)</p> <p>New trade opportunities Larger markets Increased competition Raise returns on investments Facilitate larger investments Induce industries to relocate Commit governments to reforms Increase bargaining power Enhance cooperation Improve security.</p>	<p>Generic issue related to integration (page 11)</p> <p>Benefits are not automatic Benefits may not be large Trade diversion Reduced fiscal revenues</p>
UNECA (2006) <i>Assessing Regional Integration in Africa II - Rationalizing Regional Economic Communities</i>		<p>General guiding principles (page xxii-xxiv)</p> <p><i>Aligning vision with the African Union and the NEPAD</i> <i>Strengthening efficiency</i> <i>Ensuring geographical viability</i> <i>Broadening economic and market space for investment</i> <i>Minimizing transitional arrangements</i> <i>Adopting a realistic and participatory approach</i> <i>Maintaining clarity and credibility</i> <i>Sharing responsibility</i> <i>Consolidating vested interests</i> <i>Achieving convergence</i></p> <p>Institutional objectives (page</p>	<p>Benefits of rationalization (page 46)</p> <p>Stronger economies Increased trade between member countries and countries outside the region Economies of scale Stronger negotiating position Welfare gains Improved productivity Higher wages Policy credibility More efficient provision of public goods Fewer regional conflicts</p> <p>Benefits of integration (page 83)</p> <p>Implementation of trade and</p>	<p>Observed difficulty related to integration (page xvii-xxii)</p> <p>The regional economic communities' main deficiencies</p> <p><i>Too much overlap in regional economic community membership</i> <i>Duplication of programmes</i> <i>Underfunding</i> <i>Inability to attract staff</i> Little national support for regional economic communities <i>Poor institutions</i> <i>Little translation of regional economic community goals into national plans and budgets</i> <i>Poor implementation of agreed</i></p>

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		40-41) <i>Build and strengthen institutions, including the ones related to integration</i>	market integration <i>Increased exports</i> <i>Increased imports</i> <i>Enhanced customs procedures</i> Transport programmes <i>Enhanced traffic flows</i> <i>Reduced transaction costs</i> <i>Better physical connectivity with other countries</i> <i>Enhanced cross-border movements</i> Energy programmes <i>Enhanced energy supplies</i> <i>Enhanced energy consumption</i> <i>Improved reliability</i> Food and agriculture programmes <i>Increased food security</i> <i>Improved trade in food</i> <i>Improved early warning systems</i> <i>Improved agriculture output</i>	<i>programmes</i> <i>Obstacles to movement of people across borders</i> <i>Weak legislative processes for integration</i> <i>Poor fulfilment of financial obligations to the regional economic communities</i> <i>Unclear view of the costs and benefits of integration</i> <i>Almost no popular participation</i> Little continental coordination Integration impediments (page 7) Limited capabilities and inadequate funding Multiple and overlapping membership Limited complementarity across economies Few strong regional focal points Limited domestic constituency Reliance on trade taxes of public finance Limited transport networks Limited industrial cooperation Conflicts and wars Limited movement of people Challenges in rationalization (page 67) Political will Sovereignty Compensatory mechanisms for losers Trade facilitation mechanisms

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<p>UNECA (2004b) <i>Assessment of Power Pooling Arrangement in Africa</i></p>		<p>Power pooling objectives (page 24)</p> <p>Sharing responsibility for providing reserve margin</p> <p>Larger generation facilities for better quality and lower costs</p> <p>Optimization of investment</p> <p>Reduction of project and country risks by opening more markets</p> <p>WAPP objectives (page 53)</p> <p>Institutionalizing more formal and extensive regional co-operation in the development of cost-effective electricity infrastructure and energy trading networks in order to increase energy supply and enhance energy security within the region</p> <p>Improving electricity system reliability and power quality throughout the region</p> <p>Lowering electricity system costs</p> <p>Reducing the overall amount of capital needed for electricity system expansion in the region by promoting implementation of “bankable” projects on a least-cost basis</p> <p>Creating an investment environment for the region’s power sector that will facilitate the financing of priority generation and transmission projects</p> <p>Creating an ongoing forum in which regional power issues can be discussed and worked out within an agreed-upon policy framework and a set of operating principles</p> <p>Creating a transparent and reliable mechanism for the</p>	<p>Potential benefits (page 25-27)</p> <p>Cost savings due to reductions in: <i>Operation costs due to economic power exchange</i> <i>Investment costs in additional generating capacity due to least cost development</i> <i>Spinning reserve requirements as a proportion of peak load</i> <i>Coincidental peak loads relative to average loads</i></p> <p>Improvement in reliability and security due to: <i>Mutual support during emergencies through short-term, non-firm power exchange</i> <i>Sharing spinning reserve capacity on the interconnected system</i> <i>Complementarities in means of production involving hydro- and thermal- based power generation</i></p> <p>Reduction in operating costs from: <i>Utilization of most favourable or economical energy resources</i> <i>Operational benefits (merit order loading)</i> <i>Balancing non-coincidental peak loads</i></p> <p>Lowering investment costs from: <i>Merit order investments</i> <i>Economies of scale</i> <i>Reduced total reserve requirements</i></p> <p>Benefits arising from complementary power production mixes (coordination of hydropower and thermal systems) from: <i>Increased hydropower generation in off-peak periods at almost zero cost, replacing thermal</i></p>	<p>Operation and management issues (page 55-56)</p> <p>Establishing wheeling rates and rules</p> <p><i>Unpaid and overcharged users</i></p> <p><i>Lack of guidelines for rights and obligations to wheel</i></p> <p>Setting and enforcing operations standards</p> <p>Dispatching</p> <p><i>Heavy reliance on voice telephone communication</i></p> <p><i>Lack of data links and telemetry</i></p> <p><i>Differences between systems</i></p> <p><i>Lack of control of international fault propagation</i></p> <p><i>Bridge across national systems to support more complex transactions</i></p> <p><i>Offer real-time dispatch to fully exploit flexibility of existing capacity</i></p> <p><i>Bridge language gaps between French, English and Portuguese speakers</i></p> <p>Transaction clearing</p> <p><i>WAPP should clear transactions (as opposed to leave it a bilateral issue)</i></p> <p>Raising funds – about US\$10 billion (page 74)</p> <p>Investors negative perception of stability in ECOWAS country</p>

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World Energy Council (2003) <i>The Potential for Regionally Integrated Energy Development in Africa</i>	Case for energy integration (page 3) Slow development due to lack of access to clean and reliable energy. Expensive commercial energy			Complex situation (pages 4-5) Large number of nations Country borders often made irrespectively of ethnic, linguistic or religious considerations. Factors affecting cooperation and integration (pages 39-56) Initial presence of a market to sell the product. Foreign aid historically favoured national projects Increased pressure from international environmental groups, making large projects more difficult to achieve Low density and consumption make many projects not viable from a business perspective. Difficulty to guarantee safety and security Good governance Many real or perceived risks related to institutions: <i>Lack of energy laws and regulations</i> <i>Lack of clear property rights</i> <i>Lack of capacity to enforce laws and regulations where they exist</i> <i>Currency non-convertibility (non-payment of energy import bills)</i> <i>Insecure purchasing power of energy customers</i> <i>Potential interference by governments</i>

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				<i>Breach of contracts or concession agreements.</i> Standards & Specification Compatibility
World Energy Council (2005) <i>Regional Energy Integration in Africa</i>	Energy problems (page 12): High system losses in transmission and distribution; Unsustainable tariffs; Environmental factors; Poor technical, managerial, and financial performance; Government interventionism.	Main drivers for integration (pages 12-13): Security of supply Increased economic efficiency Macro productivity	Energy integration benefits (pages 23-24): Improved security of supply Better economic efficiency Enhanced environmental quality Development of renewable resources Security and peace	Lessons learned from past African experience (pages 60-68) Evolution from Bilateral Interconnection to Regional Power Pool Political Will and Commitment Regulatory Regime Existence of a Dispute Resolution Mechanism Development of Pool Infrastructure Investment Environment Safety and security Technical Capacity
World Bank (2004) <i>Burkina Faso Power Sector Development Project</i>	Electricity sector issues (pages 4-5) High Electricity Supply Costs, Tariffs, and Subsidy Policy Increasing Demand for Electricity and Capacity Constraints. Inefficient Utilization of Electricity by End-users: The Challenge of Expanding Access of Energy to Rural and Peri-urban Populations	Wider WAPP framework designed to (page 6): Strengthen transmission network Facilitate electricity trade between member states Effective electricity exchange Strengthen energy security and efficiency.		Risks to project development objectives (pages 19-20) Policy environment to support the sector development strategy does not improve. SONABEL's performance in supplying reliable electricity to its customers does not improve Tariffs are not increased to cover SONABEL's operational costs (including depreciation) Unavailability of electricity supply from Cote d'Ivoire (for technical, contractual, or/and political reasons). Demand-side management initiatives are not adopted by

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				<p>the public administration.</p> <p>Risks to the achievement of specific project components (pages 20-21)</p> <p>Lack of commitment by DGE to implement capacity -building program.</p> <p>Delays and cost overruns occur during construction of the Bobo Dioulasso-Ouagadougou transmission line. Financing plan for the transmission line Bobo-Ouagadougou is not finalized. Counterpart funding not sufficient and/or not available on time. Delays are experienced in construction of the 14 MW thermal plant. Required behavioral changes are difficult to implement.</p>
<p>World Bank (2006a) WAPP Adaptable Program Lending (APL) 1 <i>Coastal Transmission Backbone Project</i></p>	<p>General issues (page 6):</p> <p>Poverty</p> <p>Small per capita electricity consumption</p> <p>Power system expansion challenge</p> <p>Two major power sector shortcomings (page 6):</p> <p>(a) increasing reliance on hydro-based power systems will not provide sufficient regional security of electricity supply</p> <p>(b) the lack of adequate transmission infrastructure (within and between national power systems) is the weakest</p>	<p>Vision (page 6):</p> <p>Cooperative power pooling mechanism for integrating national power system operations into a unified regional electricity market</p> <p>Stable and reliable electricity supply</p> <p>Affordable costs</p> <p>Project development objective (page 12):</p> <p>Stable and reliable exchange of electricity between “Zone A” Coastal States as a means to alleviate and/or reduce their collective vulnerability to</p>	<p>Benefits are due to (page 9 and 38):</p> <p>(a) Increasing the capability of the incumbent transmission system operators in Ghana (VM) and Benin (CEB) to supply demand during periods of poor hydrology;</p> <p>(b) Alleviating the overloading of critically overloaded transmission circuits in the VRA and CEB power systems;</p> <p>(c) Enhancing the reliability of cross-border transmission operations;</p> <p>(d) Improving the dynamic</p>	<p>Critical risks and possible controversial aspects (pages 17-18):</p> <p>Adherence to national self-sufficiency approaches to addressing particular domestic energy constraints</p> <p>Non-adherence to</p> <p>(a) <i>third party access to power generation and transmission facilities regardless of their nationality and location</i></p> <p>(b) <i>transit of electricity (power wheeling) without distinction as to the origin, destination or ownership of such electricity</i></p> <p>Major operational stability</p>

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	link in the drive towards greater cooperation in power sector development.	drought-induced power supply disruptions.	response of the national power systems (of all five WAPP “Zone A” Coastal States) in reaction to faults and outages.	challenge in case of power system disturbances originating in, and/or propagating from, Nigeria. Relatively weak project implementation capacity Overall inherent risk of public financial management in Benin (page 57): Lack of control mechanism Poor accounting and financial reporting system Inherent country risk in Ghana (page 59): Non-compliance of statutory regulations and non-enforcement of penalties.
World Bank (2006b) WAPP APL 2 <i>“Organisation pour la Mise en Valeur du Fleuve Sénégal” (OMVS) Félou Hydroelectric Project</i>	General issues (page 6, the same as in WAPP APL 1): Poverty Small per capita electricity consumption Power system expansion challenge OMVF issue (page 7): Only 200 out of a potential 1,200 MW of power in developed on the Senegal River Basin	Same vision as previous project Project development objective (page 12): Alleviate power supply deficits in WAPP Zone “B” OMVS countries by augmenting the supply of low cost hydroelectricity	Economic benefit (page 22): (Run-of-the-river hydroelectric facility) Increased supply of lower cost electricity and revenues for carbon emission reductions. Social benefits (page 25): Lowering of electricity supply costs Tangible demonstration that regionally integrated infrastructure initiatives are powerful drivers for more comprehensive socio-economic and political integration, Carbon emission reduction credits earmarked for rural electrification	Critical risks and possible controversial aspects (pages 19-20): Non-application or non-respect by the OMVS riparian countries of EEP principles that stakeholders consider to be critical for the long-term viability of WAPP: (a) <i>third party access to power generation and transmission facilities</i> (b) <i>free transit of electricity (power wheeling)</i> Poor state of communication facilities that the national power utilities rely on for real-time information exchange with the OMVS central load dispatching system at

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				Manantali. Weak capacity of the OMVS and SOGEM to oversee the construction of the OMVS Férou Hydroelectric Project