POWER SECTOR REFORM AND GOVERNANCE IN WEST AND CENTRAL AFRICA

By

Bobino Fanklin Tokam

THESIS

Submitted to
KDI School of Public Policy and Management
in partial fulfillment of the requirements
for the degree of

MASTER OF PUBLIC POLICY

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charge:

Professor Tae Yong JUNG, Supervisor

Professor Chrysostomos TABAKIS

Professor Jin PARK

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TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION

1.1. STATEMENT OF THE PROBLEM

As major reports on energy show, the power sector in Africa faces multiple issues. First,insufficient capacities, with anelectrificationratethat keeps declining with The 68 gigawatts (GW) entire generation capacity of the 48 countries of Sub-Saharan Africa is no more than that of Spain[1]. According to the World Bank, 28% only of Africans have access to electricity versus 40% in other low income regions. Secondly consumers suffer, high cost and unreliability with 56 power outageson averages in a year. Lastly, the average electricity tariff of US$0.13 per kilowatt is far above the US$0.04 to US$0.08 observed in the developing world.[2]

In West Africa, it is forecasted that electricity demand will grow at over 7% annually considering the existing grid capacity of 10,000 MW and planned retirements, in order to meet the soaring demand, it is imperative that the region increases its generating capacity at least to 27,000 MW by 2023. Majority of thecountries in West Africa produce small quantities of supply only and except for Ghana and Nigeria who can generate capacity of more than 1,000 MW. Countries in the region rely on (expensive) importation of heavy fuel oil or gas oil, or electricity.Unprecedented series of interruption in supply blamed on drought

[1]Anton Eberhardet al, "Underpowered: The State of the Power Sector in Sub-Saharan Africa ",World Bank, June 2008)

[2]The World Bank. Fact sheet: the World Bank and energy in Africa. 2013 http://go.worldbank.org/8VI6E7MRU0

are common. This led to economic recession in Ghana, Benin and Togo[3]. Insufficient generation also caused multiple outages in Nigeria (drought and draining of Kainji), Mali, Niger, and Senegal. The absence of diversification of power sources with hydropower representing the essential source of energy in most cases. The WAPP hasn't been able to attract much investment in the region a task that is difficult considering its harmonized vision for the entire region.[4]

The Different reforms implemented on the quest for potential remedy,and supposedly considered as ultimate solutions, yielded no satisfactory results. Although privatization helped improve management system and operation cost for instance, it hasn't really been able to provide more investment to develop the sector. The reluctance to input more funds in such capital intensive sector is mostly blamed on poor regulatory aspect and the deterioration of infrastructure[5]. Moreover, insufficient sources of financediscouragesinvestment;considering difficulties to access the international financial market and the weaknessof domestic markets. Despite difficulties in the financial aspect, due to incomplete reformscreatemultipleshortcomingsfor the regulatory factor. For instance, TheIndependenceofregulatory agencies is far from being a reality. The regulatory agencies often times constitute an obstacle to investment themselves.[6]Governance is also citedas a determinant factor in the cancellation of projects as shown by researchers on the

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[3]EdgardGnansounou, "Boosting the Electricity Sector in West Africa: An Integrative Vision", IAEE, p23.

[4]EdgardGnansounou, "Boosting the Electricity Sector in West Africa: An Integrative Vision", IAEE, p23.

[5] ibid

[6]DambudzoMuzenda,"Increasing private investment in African energy infrastructure", *NEPAD-OECD Africa Investment Initiative,November 2009.*

reasonprivate sector exit in infrastructure sector.[7]Weak institutions, poor legal system, lack of enforcement, lack of skills and of political will are some of the many obstacles to the success of reforms in the power sector. In some countries due to the complexity of the legal aspect of energy projects there is a lack of lawyers with experience in the sector. Certain Government departments do notpay their bills and moreover the general public isn't educated on energy conservation[8]. Different conflicts in certain countries of both West and central Africa are equally impediments to the ability to attract more investment and the performance of already established utility companies. Destruction of infrastructure has occurred during the civil war in the republic of Congo, demanding huge investment for reconstruction once the war was over.

For specialists of the review "Constructif", the main obstacles to electrification in SSA countries are not technical but rather organizational because the technical solutions are now relatively well understood.[9] This clearly suggests that it is more of a problem of governance and management rather than technical that hinders the achievement of energy sufficiency across the continent.Thus paper seeks to investigate the existence of a possible correlation or a causal relationship between the quality of governance and the difficulties inherent to power supply in SSA. More specially, the paper will seek to establish first whether or not countries that achieved improvementsinthe control of corruption, political stability better address the

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[7]Clive Harris and Kumar V. Pratap, "What drives private sector exit from infrastructure?",Gridlines,March 2009.

[8] DambudzoMuzenda,"Increasing private investment in African energy infrastructure", *NEPAD-OECD Africa Investment Initiative, November 2009.*

[9]Anjal et al, Les enjeux de l'électrificationdans les pays en développement. Constructif. N°9 November, 2004.(translated from French by author).

imbalance between supply and demand of power supply and secondly the contribution of privatization to the resolution of energy poverty. Finally, the paper will endeavor to come up with policy recommendations on how to evaluate and improve the performance of regulatory organs responsible for the well-functioning of the sector.

1.2 STATEMENT OF PURPOSE

The generic purpose of this research is to investigate possible relationship between governance in west and central Africa and the state of energy supply using credible empirical evidences. To this end, the paper will look at the behavior of countries following their national institutional endowments in relationship totherate of electrification over the years. . This being said, is there a possible correlation or a causal relationship between the quality of governance and the difficulties inherent to power supply in SSA? Could improvements the control of corruption, political stability or governance yield better assessment of the imbalance between supply and demand of power supply? To what extend have privatization been an efficient mean to address the issue of energy poverty? One major goal of power regulatory agencies is their ability to attract investment in the power sector. Is the ability to attract investor characterized by the standard of economy-wide governance and political freedom?

1.3 **SIGNIFICANCE OF THE STUDY**

More than a decade have passed since the first power reform in west and central Africa and the situation seems to have remained quite the same. In this study we evaluate the present state of power sector a decade later. Previous studies were made in the early years 2000 like such by Pierre-olivierPineau on Cameroon post privatization power sector but a more updated

analysis will give a clearer insight of the situation prevailing and pave the way for further studies.[10]

2Background

The current state of Sub-Saharan Africa'spower generation capacity is in an appalling level thus earning it the pejorative qualification of "dark continent."Indeed, notwithstanding that SSA is home to12%of the world's hydro potential including those from otherrenewableenergy sources such assolar or wind.Therecent economic growths recorded by many of the region's countries,whilst encouraging risk being held back by the power generation deficit. .

The reality is that, the Congo River despite having the biggest hydroelectric potential in the continent, only 6% of Congolese have access to electricity.[11]Only 3% of Cameroon's 23,000 MW of exploitable hydropower resources is developed.[12]. To top it all off, the situation is expected to get worse as the demand for energy keeps increasing. The link betweenlowpower generation and poverty is undeniable as it dramatically disadvantages millions of people and hinders the economy.

The above state of things is translated into an inability to connect schools, businesses,

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[10] Pierre-olivierPineau, "Transparency in the Dark – An Assessment of the Cameroonian Electricity Sector Reform",August 12, 2004

[11]BenediktFranke."Africa the "dark" continent between hope and frustration."WorldSecurityNetwork.August 24, 2009.http://www.worldsecuritynetwork.com/Africa/Franke-Benedikt/Africa-the-dark-continent-between-hope-and-frustration

[12]Seline van der Wat. "Hydro in Africa: Navigating a Continent of Untapped Potential." Hydro Review Worldwide.October2013
http://www.hydroworld.com/articles/print/volume-21/issue-6/articles/african-hydropower/hydro-in-africa-navigating-a-continent.html

households and businesses to the grid by undermining productivity on multiple levels. . Farmers are deprived of the opportunity that new technology could bring to their yields; hospitals become constrained provide modern healthcare and so goes the list of inconveniencies. It is clearly established that an absence of adequate power supply impacts poverty indicators such as infant mortality, illiteracy and life expectancy. Recent Studies are aiming at determining the impact of energy poverty on education. Macroeconomic indicators show that the average cost of power outfalls for African economies is around 2, 1% of GDP as reported by the World Bank factsheet[13].It is in response to the need to provide adequate solutions to the afore mentioned problems that this thesis is aimed at addressing.

4.1. GEOGRAPHIC LOCATION AND FEATURES

4.1.1. West Africa

The West African region is the part of the African continent which southern and western borders are constituted by the Atlantic Ocean whereas the northern border is the Sahara Desert. The Ranishanu is considered to be its northernmost part. The eastern border is either at the Benue Through or a line going from the Mount Cameroon to the Lake Chad. The region is constituted of 16 countries that include:

- Mali, Burkina Faso, Senegal and Nigerwhich are mostly in the Sahel, a transition

[13]The World Bank. Fact sheet: the World Bank and energy in Africa. 2013

http://go.worldbank.org/8VI6E7MRU0

http://www.reegle.info/policy-and-regulatory-overviews/MR

zone between the Sahara desert and the Sudanian Savanna.

- Benin, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Sierra Leone, Togo, and Nigeriaall located in the Gulf of Guinea.
- Cape Verde is an island country in the Atlantic Ocean.
- Mauritania although having joined the Maghreb countries has traditionally been located in West Africa as well.

These countries except for Mauritaniathat withdrew in 1999, form the Economic Community of West African States a regional trade and economic union also known as ECOWAS.[14]The region's geography is constituted of plains less than 300 meters above sea level with isolated high points in the southern part. The northern part is dominated by the so-called Sahel; semi-arid lands in between the Sahara and the savanna. The southern coastalpartis a zone spread out between the savanna and a rain forest.[15]According to the 2013 world population data sheet the western African region has a population of 330, 7 million people with a natural increase of 2.7%.[16]

4.1.2. Central Africa

Central Africa or rather middle Africa as categorized by the United Nations, is the region in Africa constituted by countries like Angola, Cameroon, the Central African Republic, Chad,

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[14]The Economic Community of West AfricanStates,"ECOWASmember States", December 04, 2013.
http://www.ecowas.int/

[15]Wikipedia contributors, "west Africa," Wikipedia, The Free Encyclopedia, accessed June 14, 2014.
http://en.wikipedia.org/wiki/West_Africa

[16]Population Reference Bureau,"world population data sheet",accessed June 14, 2014.
http://www.prb.org/Publications/Datasheets/2013/2013-world-population-data-sheet/world-map.aspx#map/world/population/2013

the Republic of the Congo, the Democratic Republic of the Congo, Equatorial Guinea, Gabon, São Tomé and Príncipe, Burundi and Rwanda.Eleven of the above mentioned countries form a trade and economic union called the Economic Community of Central African States (ECCAS)with the exclusion of the Democratic Republic of Congo, Angola, Rwanda and Burundi. The region is home to the great rain forest basin of the Congo River. Central Africa is dominated by the equatorial forest mostly except in the north for Chad and some parts of Cameroon and the Central African Republic which is the dwelling of the Sahel region.[17] The middle African region has a population of 138 millioninhabitants and a natural increase of 3.0%.[18]

4.2. OVERVIEW OF THE POWER SECTOR IN WEST AND CENTRAL AFRICA

According to the UPDEA (Union of Producer, Transporters and Distributors of Electricity inAfrica) data of 2006:

- The total installed capacity in Africa was about 106.3 GW from which SSA Accountsfor66.8 GW (63%);
- The total annual electricity consumption for Africa was estimated at about 488,315 GWh from which SSA accounts 325,950 GWh (66.7%);
- Total consumption of electricity per habitant per annum for Africa 532 KWh/habitant/year;

[17]Wikipedia contributors, "Central Africa," Wikipedia, The Free Encyclopedia, accessed June 14, 2014.
http://en.wikipedia.org/wiki/Central_Africa
[18] Ibid.

- West Africa 155 kWh/habitant/year
- Central Africa 151 kWh/habitant/year

Access to electricity is very low in SSA in general, if South Africa is excluded the access rate is reduced to 3 to 40% only.[19]The rate of electrification in Africaby region was the following in recent years.

ELECTRIFICATION RATES IN AFRICA

North Africa	39 to 99%
West Africa	4 to 40%
Central Africa	4 to 37%
East Africa	2.3%to 44% %
Southern	9% to 75%

Source: (1) Pool Energétique de l'Afrique Centrale (PEAC). 1 May 2011, COMELEC, 2009, SAPP 2010 Statistics, EAPP2011. WAPP September 2010

The existing power generating capacity in West Africa (MW) is as follow:

	2010		2009		Var. 2010/2009 %
	GWh	%	GWh	%	
Total energy generated	46 049	100%	39993	100%	15%

[19]Infrastructure Consortium for Africa, "Power Supply Situation in Africa", ICA annual meeting, March 14 2008.http://www.icafrica.org/fileadmin/documents/Tokyo/Background_paper_Power_Supply_situation_in_Africa_FINAL.pdf

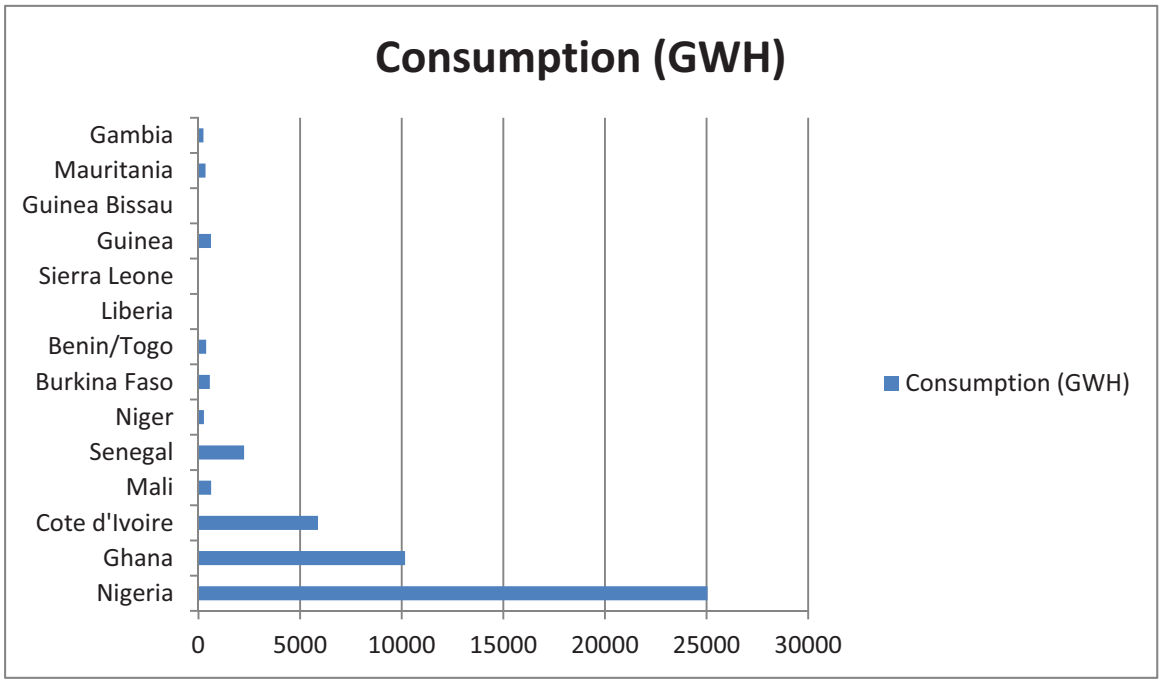
Hydro	17090	37%	17992	45%	5%
Thermal	28959	63%	22000	55%	31.6%
Energy imported	3655	7.9%	2236	5.6%	63.5%
Energy exported	2844	6.2%	2871	7.2%	-1%
Gross Consumption	46435		39357		18%

Source: WAPP: Systèmed'EchangesdEnergieElectriqueOuestAfricain, Aperçu des Projets/WAPP, Projectsat a Glance, May 2011.

Hydropower generation is mainly concentrated in two countries Nigeria and Ghanaare with respectively, 43.4% and 40.9% of the total production.It is however important to notice that the hydropower generation in the region have been decreasing in recent years.[20]The consumption of electricity was recorded as follow:

WAPP-2010 Electricity Consumption per Country (GWh)

[20]Infrastructure Consortium for Africa, "Power Supply Situation in Africa", ICA annual meeting, March 14 2008. http://www.icafrica.org/fileadmin/documents/Tokyo/Background_paper_Power_Supply_situation_in_Africa_FINAL.pdf



Sources: WAPP: Systèmed'EchangesdEnergieElectriqueOuestAfricain, Aperçu des Projets/WAPP, Projectsat a Glance, May 2011. Also Statistiques de l'Electricité du COMELEC, 2009

Electricity Access per Country (%) was as follow:

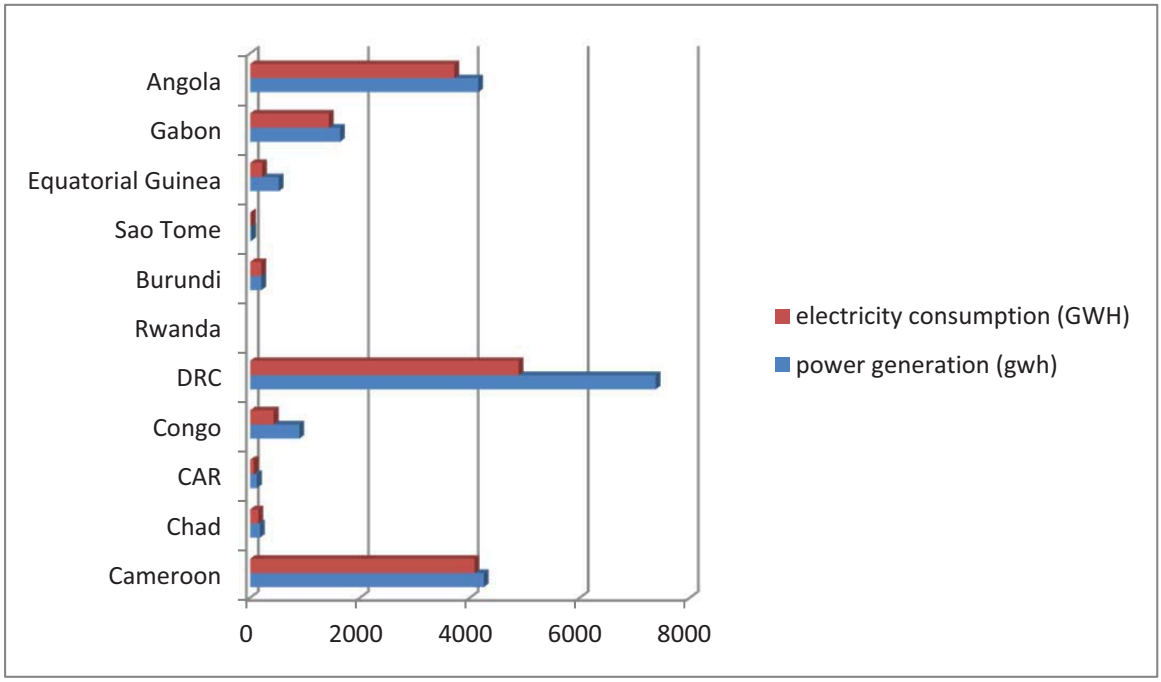
Benin	Burkina Faso	Côte d'Ivoire	Gambia	Ghana	Guinea	Guinea Bissau
23	10	30	25	25	13	3

Liberia	Mali	Niger	Nigeria	Senegal	Sierra Leone	Mauritania	Togo
5	10	3	40	30	8	19	13

Source: WAPP Generation and Transmission Assets (WGTA) First Issue, September 2010

In central Africa the scenario is somewhat similar. The annual consumption per capita is about 109kwh although the region is endowed with great hydroelectric potential. The Hydroelectric potential of the region as a whole is of about 144,200MW, with the most the Democratic Republic of Congo and Cameroon having 100,000MW and 23,000MW respectively. The energy outcome could skyrocket to a level of about 1,083,000KWh but yet, the total installed capacity is roughly 2294.502MW. The available power sources in the region are from hydroelectric, coal, gas and oil leaving too little space for renewable energy sources such as solar or wind.Recent data of power generation and consumption exhibit the following results.

CAPP-2009 Power Generation and Consumption by Country (GWh)



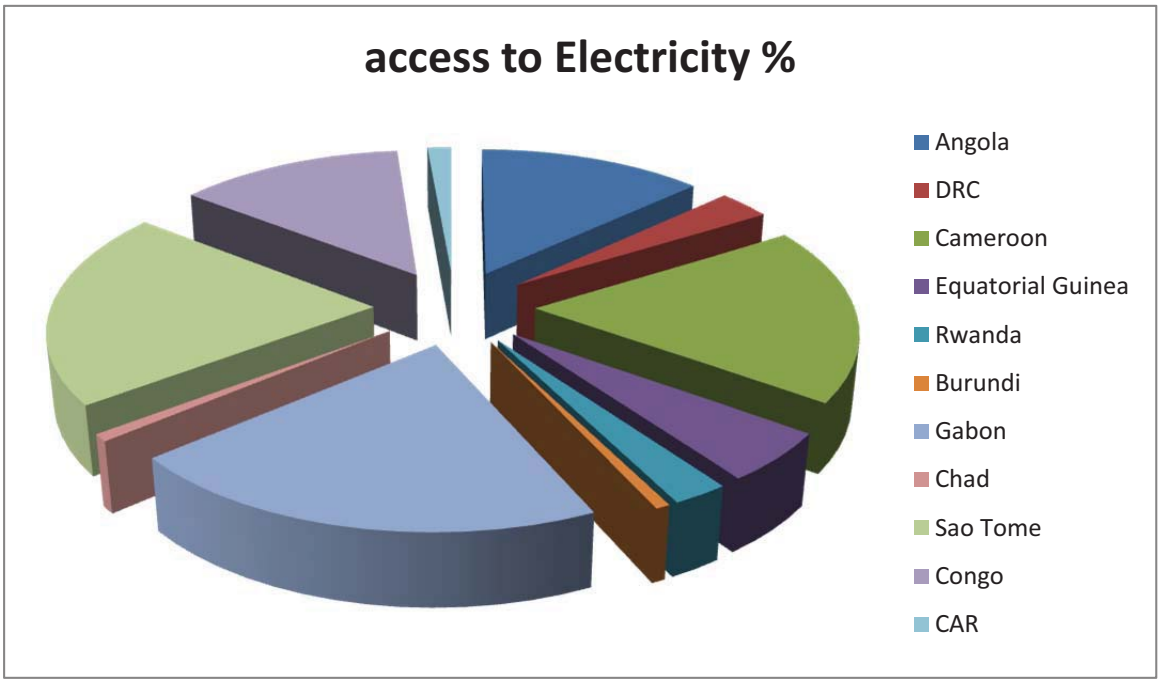
	power generation (gwh)	electricity consumption (GWH)
Cameroon	4256	4085
Chad	182	155

CAR	126	71
Congo	898	433
DRC	7383	4890
Burundi	207	207
Sao Tome	27	22
Equatorial Guinea	524	220
Gabon	1638	1436
Angola	4153	3719

Source: (1) Pool Energétique de l'AfriqueCentrale (PEAC.). Présentationgénérale du secteurélectrique en AfriqueCentrale, Europe Aid/126679/C/SER/CG; WYG International, 01 May 2011.

Despite being endowed with a huge hydraulic potential of about 144 000 KWh essentially concentrated in the Democratic Republic of Congo and Cameroon, the electrification rate in the regionhasremainedworryinglylow (13%). [21]

[21]KAPANDJI KALALA Bruno,"CURRENT STATUS OF CAPPPROJECTS", Central African Power Pool, May 22 2009. http://www.esi-africa.com/wp-content/uploads/KAPANDJI%20KALALA%20Bruno.pdf



Countries	access to Electricity %
Angola	37.80%
DRC	9%
Cameroon	53.70%
Equatorial Guinea	15%
Rwanda	7%
Burundi	1.80%
Gabon	60%
Chad	2%
Sao Tome	60%
Congo	37.80%

CAR	4%

Source: Pool Energétique de l'AfriqueCentrale (PEAC). Présentationgénérale du secteurélectrique en AfriqueCentrale, Europe Aid/126679/C/SER/CG; WYG International, 1 May 2011.

2 ENERGY REFORM IN CENTRAL AND WEST AFRICA

Reform as it is widely known is defined in terms of deregulation or minimizing government involvement in the sector. This interpretation as it is, although present in most literature and recognized by multilateral aid agencies can benefit more widened definition. Deregulation takes place for several reasons such as:

- Poor financial and technical performance
- Lack of funds to expand and develop the sector
- Developing a competitive sector and by ricochet will bring along better quality and low price.
- Remove subsidies, adjust tariffs in relation to cost
- Reduce state monopoly and provide a level playing field
- Provide legal ground for power sector stakeholders.
- Other macroeconomic constraints external to the power sector such as fiscal constraints or international investment climate can motivate the implementation of deregulation.

Commonly reforms take either the form of either a change in the nature of ownership or restructuring the company. A combination of both options is not excluded.

In the privatization option several steps and legal tools are used to make the reform effective. The most common pattern is the transformation of a wholly state owned utility company into a parastatalenterprise.The plan to give away the state-owned company can eventually lead to a total corporatization or commercialization. Privatization can also take the form of contract management where the administration of the utility company is entrusted to a private company. Related privatization actions like the amendment of an electricity act are to be considered. The objectives of amending an electricity law is to first remove the monopoly then provide legal grounds for the regulatory agencies and other stakeholders. The role of overseer is passed to an independent regulatory organ established in the place of the ministry department in the situation of a state-owned monopoly. Further privatization initiative will be the introduction of Independent private producers in the generation stage of energy production to a complete privatization of generation, transmission and distribution.[22] Restructuration or unbundling can take two aspects either vertical or horizontal unbundling. The objectives are to achieve a more efficient management of the company and to gain establish a competitive environment. Vertical unbundling designates the separation of a vertically integrated company in separate entities independently engaged in generation, transmission or distribution. Horizontal unbundle consist mostly in regionalizing the utility company. Separate new entitiesare created in charge of generation, transmission or distribution at a regional level. That is common in countries with vast territory such as the

[22]K. Syngellakis et al. , "Training Manuel on Sustainable Energy Regulation and Policymaking for Africa", United Nations Industrial Development Organization, Module 4, accessed June 14, 2014.
http://www.unido.org/fileadmin/import/83245_Module4.pdf

United States or Nigeria in our case.[23]

2.1.1 POWER REFORM IN WEST AFRICA

The region has organized itself into a pool intending to achieve integration of power system and development of a regional market. The West African Power Pool or WAPP, the institution representing the pool has helped in its effort improve electrification particularly in countries lessfavored with energy sources. The following countries belong to the pool: Benin, Côte d'Ivoire, Burkina Faso, Ghana, Gambia, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, SierraLeoneand Togo.

In the late 1990's following the structural changes and in legislative modification in the power sector independent power projects grew rapidly. By 1996 to1998, this trend slowed down to reaccelerate in 2000-2001. Nevertheless the introduction of IPP'S in the region favored mostly large scale projects with not much local private participation as opposed to medium or small scale projects.

Power sector Reforms in West Africa

Countries	Reform policy	corporatization	Independent Regulation agency	Electricity act	unbundling	Management contract

[23] K. Syngellakis et al. , "Training Manuel on Sustainable Energy Regulation and Policymaking for Africa",United Nations Industrial Development Organization, Introduction,accessed June 14, 2014. http://www.unido.org/fileadmin/user_media/Publications/Pub_free/training_manual_on_sustainable_energy_regulation_and_policymaking_for_Africa.pdf

Burkina Faso	In place	no	no	In place	none	In place
Cote d'Ivoire	In place	In place	In place	In place	None	none
Benin	In place	none	none	In place	none	none
Ghana	In place	In place	In place	In place	In place	none
Niger	In place	In place	In place	In place	In place	Pending
Nigeria	In place	In place	In place	In place	none	In place
Guinea	In place	In place	none	In place	none	none
Guinea Bissau	In place	none	none	In place	none	In place
Liberia	In place	In place	none	In place	none	In place
Mali	In place	In place	In place	In place	none	In place
Mauritania	In place	none	In place	In place	none	In place
Senegal	In place	In place	In place	In place	none	In place
Sierra Leone	In place	In place	In place	In place	none	In place
Cape Verde	In place	In place	In place	In place	none	In place
Gambia	In place	none	In place	In place	none	In place
Togo	In place	none	none	none	In place	None

Source: World Bank and PPIAF, PPI Project Database. (http://ppi.worldbank.org), UPDEA, 2006

Presence of independent producers and distributors (IPPs above 40MW as of 2013)

countries	IPP'S
Burkina Faso	none
Cote d'Ivoire	In place
Benin	none
Ghana	In place
Niger	none
Nigeria	In place
Guinea	none
Guinea Bissau	None
Liberia	none
Mali	none
Mauritania	None
Senegal	In place
Sierra Leone	none
Cape Verde	none
Gambia	None
Togo	In place

Source: Gratwick, K.N., Eberhard, A., 2011.

Major IPP projects in West Africa agreed as of August 2000

countries	Capacity/place	Year project signed	Companies
Cote d'Ivoire	210MW at Vridi 210 MW (Scheme VII)	1990 1994	CIPREL (SAUR/EdF joint venture)

	288 MW at Azito (BO Project)	1998	SAUR/EdF EdF/ABB
Ghana	110 MW at Tako Power Station 110 MW Takoradi II 220 MW near Tema 80 MW Tema	1997 1999 1998 1999	CMS-VRA CMS-VRA KMR Power, EPDL and Marubeni Union Fenosa
Nigeria	548MW (build operate) 276MW Southern Nigeria	1999 2000	Enron Siemens
Senegal	60MW 37MW	1999 1998	General Electric HQI

Sources: PSIRU database; Karekezi and Mutiso, 1999,[i] Energy Information Administration (www.eia.doe.gov),

The objective of a regional strategy was aiming at reinforcing the various reforms undertaken by most of the countries.[24]Major projects in West Africa include:

- OMVG – 2,000 kilometers of 225 kV transmission lines and associated hydropower

Projects; the 240 MW Kaléta hydro plant will be the first,

[24]EdgardGnansounou, "Boosting the Electricity Sector in West Africa: An Integrative Vision", IAEE, p23.

- OMVS – hydropower projects at Félou (62 MW) and Gouina, and expansion of the existing 225 kV transmission system in Senegal.

The WAPP Master Plan project to 2011 was as follow:

	Projects demand MW	*Additional Demand
2011	1 2,570	6 ,093
2015	1 6,638	1 0,161
2020	2 2,467	1 5,990

*Projection based on 2003 Demand

Source: WAPP, 2007

2.1.2 POWER REFORM IN CENTRAL AFRICA

Countries	Reform policy	corporatization	Regulation agency	Electricity act	unbundling	Management contract
Cameroon	In place	In place	In place	In place	none	In place
Chad	place	none	none	none	none	In place
Congo	In place	none	none	none	none	none
DRC	In place	In place	none	none	None	none
CAR	In place	none	In place	none	none	none
Equatorial Guinea	In place	In place	none	none	none	none

Sao tome & Principe	In place	In place	In place	In place	none	none
Angola	In place	In place	In place	In place	none	In place
Rwanda	In place	none	In place	In place	none	none
Burundi	none	none	none	in place	none	none

Source: World Bank (2011): Project Information Document (Pid) Concept Stage, Source:

UPDEA, 2006

Presence of independent producer or distributor in the region (IPPs above 40MW)

Countries	IPPS
Cameroon	In place
Chad	none
Congo	none
DRC	None
CAR	none
Equatorial Guinea	none
Sao tome & Principe	none
Angola	none
Rwanda	In place

Burundi	none

Source: Gratwick, K.N., Eberhard, A., 2011.

Central African countries except for Rwanda analogically to the western ECOWAS, are gathered in a Central Africa Power Pool or CAPP. Major projects in the CAPP Region include:

1. Study on the development of the Inga sites hydropower development and theassociated interconnections.
2. Rehabilitation of Inga-1 and 2 and associated transmission lines plus multinational 330 kV Solwezi-Kolwezi line.
3. Study on the Interconnections of CAPP Member States electricity grid[25]

Summary of the status of reforms in various countries

Competitive generation and distribution				
Fully unbundled utility				
Multiple generation with single		Niger Senegal Mali	Cameroon Cote d'Ivoire, Ghana	

[25]Power Supply situation in Africa

buyer (monopsony)				
Monopoly (vertically integrated utility)		Burkina Faso,		
	Sector wholly owned and managed by Government	Public corporations without management contract with private sector	Public corporations with management contract with private sector	Sector wholly owned and managed by private sector

As it can be seen none of the countries in both of the regions has fully restructured the power sector nor fully privatized it. This suggests that carrying out privatization of distribution seems more difficult than generation. By observing the performance of privatized companies in other regions such as in Mauritius, South Africa and Zimbabwe it seems that privatization might not be the ultimate solution.

1.4.3 GOVERNANCE IN WEST AND CENTRAL AFRICA

Stability in West Africa is highly at stake due mostly to the vulnerability in the Gulf of Guinea, the threat of terrorism in the Sahel-Sahara and internal conflicts. In the Gulf of Guinea, the state of security is quite precarious. There is lack of facilities and adequate materialsto ensure sustainable security. Nigeria's navy, the largest and the best equipped in

the region consists of sixteen warships and a maritime reconnaissance capability of four helicopters[26] only. This lax situationbenefitsmostlypirates and other criminals who have more or less free rein to run all sort of criminal activities. In the Sahel the presence of Al Qaida and other armed militant groupslikein Mali, Niger and Nigeria has brought along an outbreak of violent acts, kidnapping and therefore weakened the state of the security in the sub-region.

The year 1990's and early 2000 were also marked with a succession of internal conflicts in Cote d'Ivoire, Sierra Leoneand Liberia, which affected the economic development in those countries. Empirical data have shown great correlation between bad governance and instability. Before the end of the Cold War, most West African countries were subject to civil military diarchy maintained by clan allegiance, patronage, and repressive securityrackets[27]. Other systems were the ones violence peace established in Sierra Leone, Liberia and Guinea Bissau characterizedbyrampant corruption and absence of infrastructure development. Attempts to challenge such bad governance ended up in instability in Benin and Mali, and later, civil wars in Guinea-Bissau, and Cote d'Ivoire.

Nevertheless, in the 1990's the democratization process started taking place and presently all presidents in the region are either democratically elected or confirmed to their positions through ballots. This trend here is by no means without controversies as many challenges still lie ahead. Politically, with the exception of Ghana, Cape Verde, Senegal and Benin democracy is much more in retreat. Some of the regimes are clearly democracies but in

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[26]Mark J.Sorbara,"The United States and Maritime Security in the Gulf ofGuinea,"Petroleum Africa, July 2007, p.56.
[27]Abdel-FatauMusah,"West Africa: governance and security in a changing region ", International Peace Institute, 2009, p.4.

name only as they behave more like constitutional monarchies,autocracies, and virtual one-party states than to rising democracies.

This is said to affect economic performance since good resource governance depends greatly on sound political governance. It is moreover necessary to notify the inability of democracy to translate growth in development with the advent of "popular" mandates.[28]

Ranks and Score of West Africa Countries – Corruption Perceptions Index (2013)

World Rank	West Africa Rank	Country
1		Finland 59
30	1	Botswana
41	1	60Cape Verde
63	1	Ghana
77	1	Senegal
83	2	Burkina Faso
94	2	Benin
106	3	Niger
119	4	Sierra Leone
119	5	Mauritania

[28] Abdel-FatauMusah,"West Africa: governance and security in a changing region ", International Peace Institute, 2009, p.4.

123	5	Togo
127	6	Mali
127	7	Gambia
136	7	CôteD'Ivoire
144	8	Nigeria
150	8	Guinea
	9	

Source: Transparency International CPI – 2013

In central Africa, less effort towards democratization can be observed, although some elements of stability are noticeable in Cameroon, Gabon and Equatorial Guinea. Terrorist threat in Cameroon and recent conflicts in Central African Republic and the Democratic Republic of Congo suggest that the stability in the region isn't yet achieved. The "democracies"of the sub- region similar to the West African counterpart are quite questionable. Governance in central Africa has proved to be mostly dominated by autocracies with a lack of transparency, weak and highly corrupt institutions.

Ranks and Score of Central Africa Countries – Corruption Perceptions Index (2013)

World Rank	**Central Africa Rank**	**Countries**
49	1	Rwanda

72	2	Sao tome & Principe
106	2	Gabon
144	3	Cameroon
144	3	Central Africa Republic
153	4	Angola
154	4	DRC
154	4	Congo
157	5	Burundi
163	6	Chad
163	7	Equatorial Guinea

Source: Transparency International CPI – 2013

Despite encouraging changes for individual countries in the SSA region, the average CPI score stays unchanged at 33 and the CPI has gone down slightlyfor the25 topcountries in term of GDP this year.

2. Literature Review

2.1 Theoretical Background

In a laudable discussion paper on private sector electricity in developing countries, Jack D. Glen argues that privatization and regulatory reforms as opposed to state monopoly is of highest efficiency to address the issue of imbalance of supply and demand of utility in developing countries.Glen however, argues that although growth increases demand for electricity, it is the lack of investment in energy efficient technologies that causes production output to remain low in relation to the amount of energy engaged. Deregulation and

privatization of the sector in the developing world will possibly bring a favorable change in the sector and help address the imbalance between supply and demand. In this argument against the traditional monopoly in utilities business, Glen shows limits such as the inability to raise funds to finance energy efficient sector and the inefficient operation in state owned utilities companies. It is therefore necessary according to Glen, to createa suitable environment for Independent energy Producers (IPP's) to engage in generation, transmission and distribution of power.[29]

This widespread concept of reform founded on deregulation shows not very encouraging results, often times because the reforms are incomplete or rather because of malfunctions peculiar to the institutions responsible of carrying out the reform. Such connection has been previously studied by pioneers of the question such as Levy and Spiller. In their work published in 1994, the authors already noticed that it would be naive to think that privatization and regulatory reform could lead to an improvement in the quality of service or help bring down prices with the social and political circumstances not taking in account. The main argument for the study was that: "the credibility and effectiveness of a regulatory framework-and hence its ability to facilitate private investment-varies with a country's political and social institutions".[30]The problem as detected by the authorsremains the need for large scale economy of scale and scope, highly specific assets, and the clientele mainly constituted with households and therefore the voting population. For Levy & spiller,it

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[30]Brian Levy and Pablo T. Spiller, "The Institutional Foundations of Regulatory Commitment: A Comparative Analysis of Telecommunications Regulation "Journal of Law, Economics, & Organization, Vol. 10, No. 2 (Oct., 1994), pp. 201-246

is imperative to examinethe institutional endowments of the countries since they have a strong influence on the regulatory design. The design as defined by Levis & spiller is composed of regulatory governance and regulatory incentives. Regulatory governance designates the apparatus that a society uses to limit regulatory discretion and deal with inherent conflicts. Regulatory incentive however, designates the rules related to pricing, entry, subsidies and other interconnection.[31] Both tools are constrained by the institutional endowment of a country which is the country's legislative and executive institution,judicial institutions, customs and accepted norms, the administrative capabilities of country and finally ideologies and other antagonism insocial interests. The different institution should able to restraint administrative discretion when making regulatory decision giving less room to the arbitrary.

Their analysis of the telecommunication sector in UK, Jamaica, Philippines, Argentina and Chile, following a model of a country's institutional endowments establish the relationship between the political institution and the effectiveness of performance of regulatory organs.

Further study by Stern & Holder in 1999 focuses on the regulatory process and more informal accountability resulting from informal institutionalized customs and accepted norms as well as ideologies and other antagonism in social interests which were not examined by Levy & Stern. For Stern and Holder formal institutionalized mechanism consist of the legal aspect surrounding the regulatory activity while informal institutionalized mechanism designate the

[31] ibid

process through which regulatory activity takes place. Meaning for instance how the different stakeholders interpret the existing legislation.[32]The formal accountability aspects include:

- Clarity of Roles and Objectives
- Autonomy
- Accountability

The informal accountability aspects studied are:

- Participation
- Transparency; and
- Predictability. [33]

Stern and Holder use a framework made of best practices by OECD countries to evaluate the infrastructure industry of Asian countries such as Bangladesh, India, Indonesia, Malaysia, Pakistan and Philippines.Some key definitions are given in the following table:

Box 1: Criteria for Regulatory Governance and Best Practice Definitions

[32] Jon Stern,"Evaluating infrastructure regulators: developing UK and international practice.",CPEA 2006, September

[33]Stern and Holder, 1999, p.42

1. **Clarity of Roles and Objectives**: The regulatory function is well articulated, well enshrined in primary legislation, and clearly separated in practice from policy and commercial functions.

2. **Autonomy**: There is a separate regulator with arrangements for appointment and financing which appear to guarantee autonomy of action.

3. **Participation**: A comprehensive process of formal consultation (including public hearings and publication of and comment on consultation responses) is followed before decisions are made.

4. **Accountability**: There is full accountability in terms of appeals, including a specific legal right of redress. The accountability of the regulator to Courts or parliament for fulfilling general legal duties is appropriate without being excessive.

5. **Transparency**: All regulatory documents are available to the public, except where specifically classified as confidential and the regulator publishes major decisions as well as the reasoning behind major decisions.

6. **Predictability**: Regulatory powers and duties cannot be changed without changes in primary law; key regulatory instruments or documents cannot be changed without undergoing appropriate processes; and there is a clear policy and coherent approach behind all decisions.

Source: Stern and Holder, 1999, p.45.

Following stern and holder's study it is possible to evaluate the performance of regulatory organs and define in beyond the legal aspect what good regulatory governance is and what it isn't.In a 'A Handbook for Evaluating Infrastructure RegulatorySystems" published by the World bank, Stern et al elaborate a full statement of best practices including:

(i) Three regulatory meta-principles;

Namely credibility because investors sentiment must be that the organ will keep its commitment, legitimacy by providing protection of consumers rights, and transparency so that both consumers and investors know the rule of the game.

(ii) Ten key principles;

- independence;
- Accountability;
- Transparency and public participation;
- Predictability;
- Clarity of roles;
- Completeness and clarity in rules;
- Proportionality in application;
- Requisite powers;
- Appropriate institutional characteristics;
- Integrity of conduct.

(iii) A full list of critical standards for regulation

As define by the handbook the headings for industry outcome are to be :

1. Output and consumption;
2. Efficiency;
3. Quality of supply;
4. Financial performance;
5. Capacity, investment and maintenance;

6. Prices;

7. Competition;

8. Social indicators.[34]

For Stern as well as Levy and spiller, the effectiveness of the regulators depends on the quality of governance and regulatory decision.[35] The governance aspect will have to answer question like: is the regulatory agency established by a primary law?Do specified regulatory processes exist?How transparent is decision making, etc.

Effective evaluation as suggested by Stern will consist in:

- identifying obviously good and bad regulatory decisions – particularlykey decisions;
- estimating qualitatively and, where possible, quantitatively the impactof key decisions on industry outcomes;
- review the contribution of regulation to the performance of theregulated industry and specific outcomes;
- provide a critical analysis of regulatory performance withRecommendations for improvement;
- Provide a basis for learning by the regulator, the government,consumer groups, companies, investors and others.[36]

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[34] Stern et al, "A Handbook for Evaluating Infrastructure Regulatory Systems", World Bank

[3535] Jon Stern, "Evaluating infrastructure regulators: developing UK and international practice.", CPEA 2006, September, p11.

[36] Jon Stern, "Evaluating infrastructure regulators: developing UK and international practice.", CPEA 2006, September, p11.

In the handbook for evaluating regulators, countries are classified in 4 types following their commitment and capacity. And so Countries with strong commitment and strong capacity

(eg, UK, Germany, Canada, Chile, South Africa)

2. Countries with weak commitment and strong capacity

(eg, Argentina, India and Russia)

3. Countries with strong commitment and weak capacity

(eg, Brazil, Ghana, Romania, Turkey and Uganda)

4. Countries with weak commitment and weak capacity[37]

The focus will be placed on countries in the category three which is the case of majority of countries in the sub-Saharan region. The objective will be to identify possible impediments and apply suitable solutions following the best practices gathered from the OECD.

For Stern"econometric and other formal, statistical models can be usedto investigate the impact of regulation on specific regulated industryoutcomes."

2.2 Empirical background

In a paper published by the World Bank, Maria Vagliasindi studies the role of regulatory governance in driving public private investment in power distribution and transmission. A cross- section of 105 developingcountries in a period of 15 years allows her to study questions such as the effect of factors like presence of a regulatory agency, standard of economy-wide governance, market size and income and integration of renewable energy on the likelihood to attract investors in the sector of electricity transmission and distribution and also their livelihood. The study reveals that theonlypresence of regulators affects the

[37] ibid

entrance not the volume of investment. No significant link with higher investment is determined. Analogically the state of the economy-wide and governance affect the entry only, suggesting that private investor once in the market tend to accommodate the governance standards. The introduction of renewable enhances investment. However the market size as well as the income level is a strong determinant in the level of investment.[38]

[i]3. DATA DESCRIPTIONS AND METHODOLOGY

3.1 Sample and source of Data

With the aim of testing the possibility of a relationship between power sector performances and governance, we collected data from 26 Central and West African countries, for a period of 15 years (1997 to 2011).We constructed a longitudinal panel set out of the data from the above sample of countries. An advantage of panel data is the ability it gives to control the effects of missing or unobserved variables given that informationon both over time dynamics and individual of the countries are captured in the model.Data are collected from mainstream statistical databases such as the World Bank, the Kaufman index of governance, the International Energy Agency (IEA) and the World Bank/PPIAF PPI Database. The countries selected are all dealing with power crisis.

3.2 Definition of variables

The selection of variable is from the macro level with: (1) demographic variables such as population, (2) macroeconomic variables such as per capita GDP, (3) economy wide

[38] Maria Vagliasindi,"The Role of Regulatory Governance in Driving PPPs in Electricity Transmission and Distribution in Developing Countries", World Bank, July 2012

governance variables such as the control of corruption, regulatory quality and democracy (4) a dummy variable for nature of ownership, micro level variables based on(5) annual investment in electricity with private participation.We made use of publicly available information on the nature of ownership and import dependence for the selected countries to build dummy variables. Table 3.1 is a description of the above variables.

Table 3.1 Description of variables

Variables	Description
regulatory quality ***wgi_regq*** (ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance)	Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
Control of corruption ***wgi_cc*** (ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance)	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

Degree of democracy ***Polity2***	Revised Combined Polity Score: This variable is a modified version of the POLITY variable to facilitate the use of the POLITY regime measure in time-series analyses. It ranges from +10 (strongly democratic) to -10 (strongly autocratic), based on 6 indicators.
Energy supply per capita in Kwh ***logsupply_pc***	Generation and net import of electricity for a single individual.
Investment invest	annual investment in electricity with private participation
GDP per capita ***loggdpc***	Gross domestic product
Population Logpop	Population
Ownership dummy 1 if privately owned or managed 0 if publicly owned or managed (management contract)	The companies nature of ownership either privately ownership and/or management or SOE

Patents	Patent applications are worldwide patent applications filed through the Patent Cooperation Treaty procedure or with a national patent office for exclusive rights for an invention--a product or process that provides a new way of doing something or offers a new technical solution to a problem.
Domestic credit to private sector (% of GDP) credit_privgdp	Domestic credit to private sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises.
Pump price for gasoline (US$ per liter) price_gasoline	Fuel prices refer to the pump prices of the most widely sold grade of gasoline. Prices have been converted from the local currency to U.S. dollars.
a_i	Captures unobserved, time constant factors that affect consumption of electricity such as weather conditions
e_{it}	Unobserved heterogeneity or time varying error

3.3 Methodology

We conduct the present analysis using econometrics instruments. An econometric model was built to test the relationship between performance of utility company and country wide governance. More specifically, the study attempts to see beyond the relationship, a causal

effect of governance on performance of power companies. Limitations can be noticed due to difficulties in accessing data for tariffs and climatic inconsistencies that may affect the functioning of hydropower plants i.e.

The panel is define as follow :

First model

lsupplypc =β_0+β_1wgi_ wgi_cc +β_2wgi_ polity2 +β_3 wgi_ price_gasoline +〖β〗_4 invest + β_5 wgi_ credit_privgdp + β_6 loggdpc + β_7 logpop+β_8 patents +β_9ownership +β_10 inf_cpi +u_it

second model

lsupplypc =β_0+β_1wgi_ wgi_rol +β_2wgi_polity2 +β_3 wgi_ price_gasoline + 〖β〗 _4 invest + β_5 wgi_ credit_privgdp + β_6 loggdpc + β_7 logpop+β_8 patents +β_9ownership +β_10 inf_cpi +u_it

Third model

lsupplypc =β_0+β_1wgi_ wgi_regqu+β_2wgi_polity2 +β_3 wgi_ price_gasoline + 〖β〗 _4 invest + β_5 wgi_ credit_privgdp + β_6 loggdpc + β_7 logpop+β_8 patents +β_9ownership +β_10 inf_cpi +u_it

Where; “lsupplypc” designates the logarithm of per capita supply of electricity. We intend to reduce or eliminate skew bydefining the above variable in logarithmic terms.A white test forheteroscedasticitywas conducted and and allows us to reject the hypothesis that

the model suffer from heteroscedasticity bias.Moreover, a test of omitted variables bias allowed us to reject the presence of omitted variable bias.

An interaction term introduced in the model putting together the nature of ownership and the level of corruption revealed insignificant and highly problematic when a preliminary test of multicollinearity was conducted we therefore excluded the term.

4. RESULTS AND DISCUSSION

Following panel fixed and random effect regressions, the Hausman test of specification suggest random effect results as our optimum estimation. The panel effect was aiming at controlling for time invariant variables. The above regression allowed us to obtain robust results with an R^2 equal to 0.6657, meaning close to 67 percent of our dependent variable is explained by the following model.

Serial correlation

Robust result show high degree of statistical significance for our main variables of interest. The key result of the paper are the following:

- Countries with high revenue record an increase in supply

An outstanding factor can be viewed in GDP per capita as we observe a positive statistically significant relationship with per capita power consumption. This to some extend joins previous findings by Maria Vagliasindi on the volume of investment in power sector being influenced by income. A higher GDP implies investment or production which requires intensive energy supply this is explained by the following results.

- System Improvements due to fight against corruption can be translated into an increase in power supply.

Confirmation of our hypothesis stands forcontrol of corruption, as an increase in the index yields more power supply although the level of significance recorded isn't ostentatious. However a negative significant association is detectable between democracy and per capita electricity supply. This suggests that countries with high rank of democracy have registered a decrease in supply as data suggests. This remains debatable since most of the countries have more or less the same level of democracy.

- No significance of privately owned companies

The type of ownership is found to be not significant enough to draw any conclusion on their effect on the dependent variable.

We controlled for elements like the price of alternative source of energy namely gasoline, the number of patents as a proxy for the scientific and technological advancement of the country and finally access to credit by private entities as a percentage of GDP. All of the variables are highly correlated but yield relatively ambiguous relationships. Weviewed gasoline as an alternative to hydroelectric electrificationbecause of the fact that oil fueled electric generator are still used to produce electricity in countries with poor hydroelectric potential. The negative correlation displayed in the results could suggest here that oil is an input in itself in the production of electricity; therefore an increase of its price decreases powersupply. We tested for different indexes of governance by using them as a substitute for to control of corruption in the following model. Given the high correlation between control of corruption and others governance quality indexes we found it wise to treat them separately. The rationale behind such action is that systematic corruption a resultant of the poor state of institutions is to be differentiated from idiosyncratic corruption which exist regardless of the

state of institution and can bring about a different impact. Important indexes such as rule of law and regulatory quality were picked separately in different models to measure the efficiency with which regulatory organs achieve the target of increasing supply to meet the ceaselessly increasing demand.

In both regressions positive highly significant results for both variables are noticeable, confirming the previous finding with control of corruption.

Table 4.1

Dependent variable: Power supply per Capita

	‘		Robust standard errors	
	Fixed Effect	Radom Effect	Fixed Effect	Radom Effect
Control Of Corruption	**0.208****	**0.201****	**0.208*****	**0.201*****
	(0.086)	(0.082)	(0.055)	(0.053)
Democracy	**-0.054*****	-0.049***	-0.054***	-0.049***
	(0.018)	(0.017)	(0.009)	(0.007)
ownership	0.111	0.107	0.111	0.107
	(0.157)	(0.146)	(0.073)	(0.069)
Log GDPC	**0.673*****	**0.690*****	**0.673*****	**0.690*****
	(0.088)	(0.075)	(0.085)	(0.075)
Log Population	-0.121	-0.102	-0.121**	-0.102**
	(0.076)	(0.066)	(0.049)	(0.048)
Investment	**0.000**	**0.000**	**0.000****	**0.000*****
	(0.000)	(0.000)	(0.000)	(0.000)
Inflation (CPI)	-0.001	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.001)	(0.001)
Price of Gasoline	**-0.847*****	**-0.820*****	**-0.847****	**-0.820*****
	(0.266)	(0.185)	(0.296)	(0.144)
Patents	**-0.428****	**-0.409****	**-0.428*****	**-0.409*****
	(0.175)	(0.166)	(0.131)	(0.145)
Private credit (%GDP)	**0.023*****	**0.022*****	**0.023*****	**0.022*****
	(0.008)	(0.008)	(0.005)	(0.005)
_cons	3.001*	2.561*	3.001**	2.561**

	(1.715)	(1.363)	(1.323)	(1.046)
R^2	0.68	0.68	0.68	0.68
N	125	125	125	125

With rule of law as our main variable of interest the regression display the following results:

Table 4.2

Dependent variable: Power supply per Capita

			Robust standard errors	
	Fixed Effect	Radom Effect	Fixed Effect	Radom Effect
Rule Of Law	**0.536*** **	**0.510*** **	**0.536*** **	**0.510*** **
	(0.138)	(0.132)	(0.088)	(0.086)
Democracy	**-0.059*** **	**-0.053*** **	**-0.059*** **	**-0.053*** **
	(0.017)	(0.016)	(0.009)	(0.007)
Ownership	0.031	0.038	0.031	0.038
	(0.153)	(0.142)	(0.086)	(0.071)
Log GDPC	**0.671*** **	**0.703*** **	**0.671*** **	**0.703*** **
	(0.082)	(0.069)	(0.075)	(0.065)
Log Population	**-0.139***	**-0.107***	**-0.139*** **	**-0.107*** **
	(0.072)	(0.063)	(0.054)	(0.052)
investment	**0.000**	**0.000**	**0.000*** **	**0.000*** **
	(0.000)	(0.000)	(0.000)	(0.000)
Inflation (CPI)	-0.001	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.001)	(0.001)
Price of Gasoline	**-0.851*** **	**-0.768*** **	**-0.851*** **	**-0.768*** **
	(0.252)	(0.177)	(0.268)	(0.130)
Patents	**-0.428*** **	**-0.408*** **	**-0.428*** **	**-0.408*** **
	(0.165)	(0.157)	(0.095)	(0.108)
Private credit (%GDP)	**0.012**	**0.011**	**0.012***	**0.011***
	(0.009)	(0.008)	(0.006)	(0.006)
_cons	3.810**	2.986**	3.810**	2.986***
	(1.666)	(1.322)	(1.396)	(1.115)
R^2	0.70		0.70	
N	125	125	125	125

Finally With regulatory quality as our main variable of interest the regression display the following results:

Table 4.3

Dependent variable: Power supply per Capita

			Robust standard errors	
	Fixed Effect	Radom Effect	Fixed Effect	Radom Effect
Regulatory Quality	**0.542*** **	**0.446*** **	**0.542*** **	**0.446*** **
	(0.178)	(0.163)	(0.099)	(0.093)
Democracy	**-0.057*** **	**-0.048*** **	**-0.057*** **	**-0.048*** **
	(0.017)	(0.016)	(0.008)	(0.005)
ownership	0.101	0.131	0.101	0.131*
	(0.154)	(0.144)	(0.084)	(0.078)
Log GDPC	**0.643*** **	**0.704*** **	**0.643*** **	**0.704*** **
	(0.088)	(0.073)	(0.072)	(0.069)
Log Population	**-0.191** **	**-0.139** **	**-0.191*** **	**-0.139*** **
	(0.076)	(0.065)	(0.056)	(0.052)
Investment	0.000	0.000	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Inflation (CPI)	0.000	-0.000	0.000	-0.000
	(0.002)	(0.002)	(0.001)	(0.001)
Price of Gasoline	**-1.003*** **	**-0.826*** **	**-1.003** **	**-0.826*** **
	(0.256)	(0.181)	(0.331)	(0.164)
Patents	**-0.458*** **	**-0.438*** **	**-0.458*** **	**-0.438*** **
	(0.173)	(0.167)	(0.122)	(0.132)
Private credit (%GDP)	**0.018** **	**0.018** **	**0.018** **	**0.018** **
	(0.009)	(0.008)	(0.008)	(0.007)
_cons	4.749***	3.279**	4.749***	3.279***
	(1.808)	(1.389)	(1.490)	(1.177)
R^2	0.69		0.69	
N	125	125	125	125

5. CONCLUSION

The interest of this paper is the relationship between the poor performance of power sector and the state of governance in west and central African countries. Our basic hypothesis is whether the state of institutionsis a strong determinant of the generallylow power production. Another aspect of the question was whether the nature of ownership did play a role as countries moved from public to private management. The results from this regression allow us to make more sense of the phenomenon.

Our findings confirmed relatively significant statistical relations between power supply per capita and the level of corruption. Stronger relationship where exhibitedwhen applied to the income level and price of a substitute. The regression from this model showed no statistically significant results related to inflation, investment in the sector or even the nature of ownership.

Obviously limitations are to be taken into consideration such the lack of access consistent and more specific data in the following sector. Lack of information on weather impact and country specific aspects although captured in the fixed effect could make the model more complete. Furthermore availability of time series information on the tariff of utility or even a better determinant of performance of power supply such as time series information on access to electricity would have also allowed making more bold conclusions. A counter intuitive result yield by the relationship with scientific and technical advancement state of the countries is also to be taken in consideration.

However the overall picture shows more similarity to previous studies and theoretical hypothesis by Maria Vagliasindi and Devendra Kodwani. The importance of the quality of regulatory organs had been established by Levy & Spiller and additionally, studies on further

organizational aspects allowedStern & Holderto elaborate a framework from collected best practices. It is more consistently important to consider beyond the evaluation of the overseer themselves conduct an assessment of the country wide governance state. Transparency and accountability could introduce more efficient management of the sector, both in the investment climate and the financial management of the utility companies. Lack of transparency in the privatization process, Absence of Reinvestment, misalignments of public funds, excessive loss in the transmission and distribution phase are many issue a more transparent organizational environment could help tackle.

In conclusion to this study, it can be said that the existence of a possible association between macroeconomic performance, country wide governance improvement and the performance of utility companies can be drawn. An intensive fight targeting corruption in the following countries is necessary to improve by ricochet the state of energy poverty. Incentives and demand for monitoring and evaluation in the sector should be increased. Such activities in return can help define responsibilities and accountability. This stands as well for investment attractiveness which depends highly business climate in the countries. A more convincing factor is the economic performance of the countries which can serve drag consumption of power energy up as a result of economic well-being.

Reforming the Power Sector in Africa, M R Bhagavan (ed.) ZED Books Ltd, London and New York

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