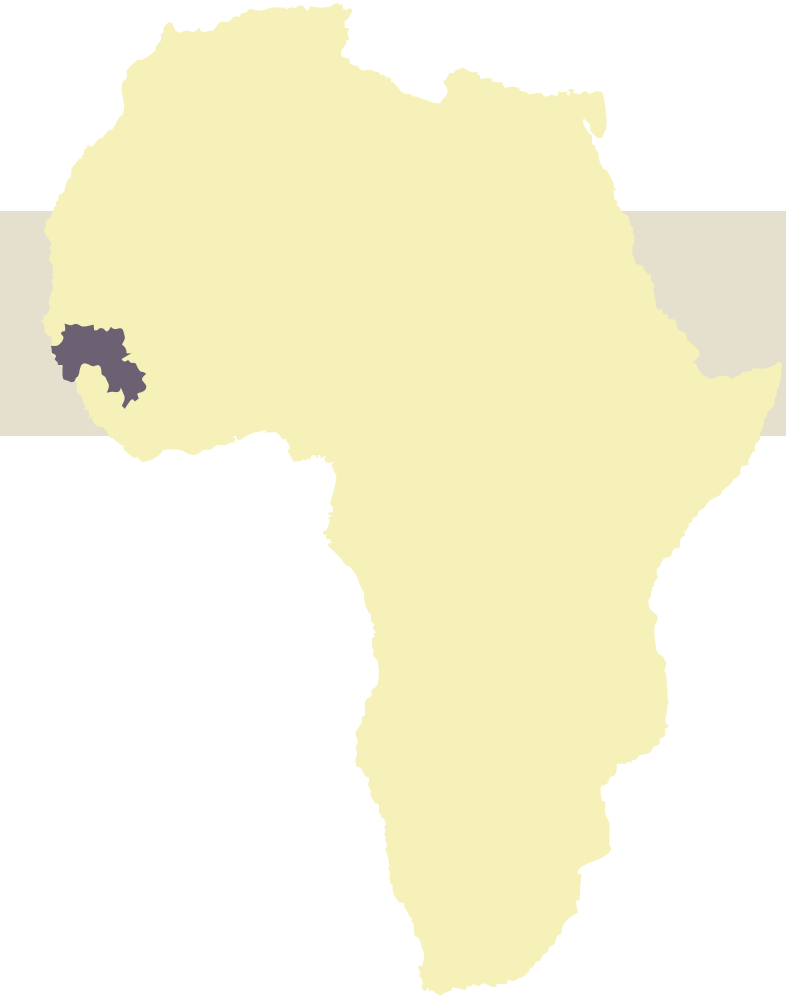

COUNTRY CHAPTER: GUINEA

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ACRONYMS AND ABBREVIATIONS

GUINEA

ADB	African Development Bank
ADB	Asian Development Bank
BERD	Bureau Électrification Rural Décentralisé (Rural Electrification Decentralized Office)
CEDEAO	Communauté Économique Des États de l ,Afrique de l'Ouest (Economic Community of West African States – ECOWAS)
DNEF	Direction National des Eaux et Forêts (National Division of Water and Forestry)
DNHE	Direction Nationale de l'Hydraulique et de l'Energie
ECOWAS	Economic Community of West African States
EDG	Electricité de Guinée (Guinea Electricity)
EU	European Union
GDP	Gross Domestic Product
GNF	Guinea Francs
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (German Technical Cooperation Agency)
HDI	Human Development Index
HIPC	Heavily Indebted Poor Country
HV	high voltage
IEPF	Institut de l'Énergie et de l'Environnement de la Francophonie (Institute for Energy and the Environment in French Speaking Countries)
IFAD	International Fund for Agricultural Development
LPG	Liquefied Petroleum Gas
LPDSE	Lettre de Politique de Développement du Secteur de l'Énergie (Policy Letter for the Development of the Energy Sector)
LV	low voltage
MDG	Millennium Development Goals
MSF	Médecins Sans Frontières
MV	medium voltage
NDE	National Division of Energy
NGO	Non-governmental Organization
NMG	National Multisectoral Group
OPEC	Organization of Petroleum Exporting Countries
PDE	Direction Préfectorales de l'Éducation (Prefectoral Directorate for Education)
PREP	Poverty Reduction Program
PRSP	Poverty Reduction Strategic Paper
PV	Photovoltaic
SGP	Société Guinéenne de Pétrole (Guinean Oil Company)
SOGUIP	Société Guinéenne des Pétroles (Guinean Oil Society)
TSPP	Taxe Spéciale sur les Produits de Pétrole (Special Taxes on Petroleum Products)
UNDP	United Nations Development Program
USAID	United States Agency for Internal Development
USD	United States Dollar
WB	World Bank

MEASUREMENTS

€	Euro (1 EUR = 7,291 GNF; 1000 GNF = 0.13715 €).
GWh	gigawatt hour (1 GWh = 1,000,000 kilowatt hours (kWh))
km^2	square kilometer
kWh	kilowatt hour
kWp	kilowatt peak
m/s	meters per second
m^3	cubic meter
mm	millimeters
MW	megawatt (1 MW = 1,000 kW)
Wp	Watt-peak
°	degree

SUMMARY

The Country Study of Guinea is to provide an overview of the country's energy market and to support decision-making for private investments for the Renewable Energy (RE) sector in Guinea. The study is structured as follows:

Chapter one provides **Background Information on Guinea**. This includes an overview of geographical and climatic conditions, as well as the most important facts in view of political, economic and socio-economic conditions of Guinea.

Chapter two summarizes facts and figures of **Guinea's Energy Market** including stakeholders and market actors involved as well as sector related regulations.

Chapter three presents the currently existing **Political Framework for Renewable Energies** in Guinea. This includes an overview of support mechanisms for photovoltaic (PV) as well as existing regulations, incentives and legislative framework conditions concerning other RE technologies.

Chapter four provides a brief overview of the **Status Quo and Potential for Renewable Energies** in Guinea.

Chapter five summarizes the existing and potential **Market Risks and Barriers** in general with focus on RE.

Chapter six presents a compilation of the most relevant **Renewable Energy Business Information and Contacts** of Guinea.

1 COUNTRY INTRODUCTION

1.1 GEOGRAPHY AND CLIMATIC CONDITIONS

The Republic of Guinea[1] is located in West Africa between latitudes 7°05‘ and 12°51‘ South and longitudes 7°30 and 15°10‘ West. Its geographic size equals 245,857 km². It is bordered in the East by Mali and the Ivory Coast, in the West by the Atlantic Ocean (with 300 km of coastline) and Guinea-Bissau, in the North by Mali and Senegal and in the South by Sierra Leone and Liberia. Guinea comprises four physiographic provinces characterized by different climates, soils, vegetations and landscapes.

FIGURE 1
Map of Guinea

Guinea has a humid tropical climate with two alternating seasons, the dry season and the rainy season. The rainy season lasts an average of eight months in Forested Guinea and five months in High Guinea. Thus, Guinea is one of the few West African countries with high rainfalls, varying between 1,200 and 4,000 mm per annum. Most rivers of the West African region (Gambia, Senegal, Niger) spring from the Fouta Djallon Massif; that is why Guinea is called the “Water Tower” of Western Africa.

Maritime Guinea or Flat Guinea covers 18 % of the country’s territory and is characterized by mangrove swamps. The coastal area has a huge water supply potential and offers opportunities for farming and fishing. The maritime region of guinea produces rice, fruit, vegetables, tubers, salt and palm oil but also bauxite and various manufacturing products.

The Middle Guinea or Fouta-Djalon covers 22 % of the territory and is characterized by tree and bush savanna. Farming and livestock breeding are the predominant activities of its economy with 39 % of all country’s livestock breeders being based in Middle Guinea. The region’s main products are fruit, vegetables, grain (fonio[2], corn and rice) and tubers (cassava, sweet potato and potato). Another important source of income is the crafts industry. Besides that, there is also a significant potential for the development of a tourism industry in this region.

High Guinea is characterized by tree and bush as well as grassy savanna covering 40 % of the territory. Being an auriferous region “par excellence”, both industrial gold production and traditional gold washing are being performed. Livestock breeding (with 27 % of identified livestock breeders ranking on position 2 behind Middle Guinea), farming and continental fishing in the Niger River basin further contribute to the region’s economy. People are also active in subsistence farming and commercial farming. These sectors, however, suffered from major production difficulties in the last few years. As a consequence, the industrial fruit and cotton processing units have ceased to operate for the time being. In the craft industry sector, traditional pottery is well developed.

The Forested Guinea is dominated by tropical rainforest and stretches over 20 % of the territory. It is characterized by mining, agro-pastoral activities and forestry as well as craft industry activities. In addition to growing crops for their own livelihood, people are active in the production of products for export purposes, namely coffee, cocoa, tobacco, tea and rubber. Forestry resources are being exploited with both traditional and industrial methods.

1.2 POLITICAL, ECONOMIC AND SOCIO-ECONOMIC CONDITIONS

The Republic of Guinea is one of the very first French speaking countries in West Africa gaining independence in 1958. The following separation had a very positive effect on the political development and economic growth. In fact, Guinea clearly opted for stopping exchange and cooperation with former colonizers through its choice of a total and immediate independence. As a result of this, France decided the immediate withdrawal of the colonial administration. As an independent country, Guinea faced several difficulties and decided to enter a partnership with the Soviet Union. The country experienced a particularly active stage of political and social evolution during the liberation wars in Guinea-Bissau and Cape-Verde. The so-called “First Republic” (1958 to 1984) was characterized by a socialist and centralized type of state controlled economy. The state was intervening in all economic sectors including the productive sector, the commercial sector and even the banking system. The Second Republic (1985 up till now) is characterized by an open market economy with substantial economic and financial reforms.

The total population of Guinea is estimated at 9.4 million as of 2008 when the last general population census took place. Its gender distribution comes to 48.7 % of men and 51.3 % of women. The Guinean population lives mainly in rural areas (71.2 %) with less than a third (28.8 %) of its people living in urban areas. Conakry, the capital city of the country,

1 THE NATION IS SOMETIMES CALLED GUINEA-CONAKRY TO DISTINGUISH IT FROM ITS NEIGHBOUR GUINEA-BISSAU.

2 WHITE FONIO (D. EXILIS) IS THE MOST IMPORTANT OF A DIVERSE GROUP OF WILD AND DOMESTICATED DIGITARIA SPECIES THAT ARE HARVESTED IN THE SAVANNAS OF WEST AFRICA.

concentrates more than one half of the total urban population. This is why it grows faster than most of the big cities in the sub-region. Guinea is one of the less developed HIPC (Heavily Indebted Poor Country) countries. The country ranks at 156th out of 177 countries with a per capita GDP of 375 USD and a Human Development Index (HDI) of 0.466 (as of 2003). High Guinea and Middle Guinea remain the poorest regions of the country. Table 1 presents a summary of the country specific HDI figures.

TABLE 1

Human Development Indicators (HDI) of Guinea

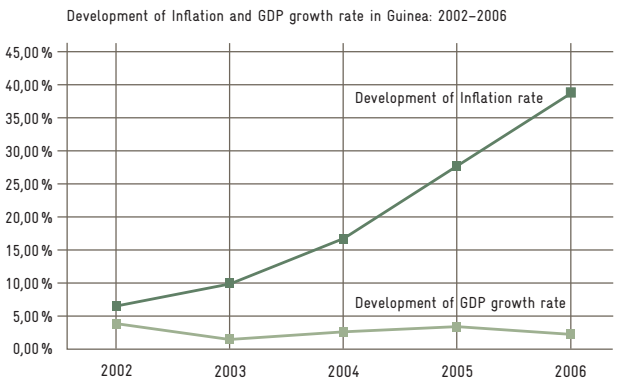
ISSUE	RATING IN GUINEA	RATING IN AFRICA
Life expectance at birth	49	53
Infant mortality rate	11,4 %	7,8 %
Access rate to health facilities	58 %	60 %
Access rate to potable water	48 %	60 %
Gross primary school enrolment	63 %	81 %
Gross secondary school enrolment	13 %	29 %

Source: UNDP, as of 2003, and UNDP/Human Development Report, as of 2009

The Guinean social situation still remains unstable, mainly because of consumer prices rocketing with a nearly 40 % rise in basic goods' prices, namely for rice, sugar, milk and cooking fuels. More than half of the Guinean population (approx. 53.6 %) lives on less than half a USD a day. A large group of the population (about 19 %) lives under extreme poverty, i.e. on less than USD 0.32 per day. Figure 2 illustrates the GDP growth compared to the development of the country's inflation rate.

FIGURE 1

GDP Growth Rate and Inflation Rate (2002–2006)



Source: IMF/Guinean Ministry of the Economy, Finances and Planning: PRSP, as of August 2007

The rapid inflation, shifting from 6 % in 2002 to nearly 40 % in 2006, made some donor partners (WB, ADB, IFAD, OPEC etc.) suspend ongoing projects and programs in Guinea.

2 ENERGY MARKET IN GUINEA

2.1 OVERVIEW OF THE ENERGY SITUATION

Guinea has a significantly low rate of access to electricity, with less than an estimated 17 % for the entire population. As a result of the insufficient production capacity, there are serious malfunctions and blackouts in the electric power sector of Guinea. As to hydrocarbons, Guinea does not have proven reserves despite of ongoing researches at various sites. Therefore, the bulk of the country's demand is covered by imports.

2.2 ENERGY CAPACITIES, PRODUCTION, CONSUMPTION AND PRICES

Electricity Sector

The installed electricity production capacity equals approximately 239 MW and is provided by 9 hydroplants and 18 thermal power plants. The production capacity of the 9 hydroplants is 127 MW. Table 2 presents an overview of existing electricity production facilities. Table 3 provides information on the cost structure of thermal electricity production.

The major performance indicators of the electricity sector are: (i) the low rate of access to electricity (less than 17 %, i.e. 1.5 out of 9 million inhabitants), (ii) the very low billing rate (53 %), (iii) the low rate of recovery/collection (an estimated 80 %). As a result of this particularly dilapidated state of the electric power industry, Guinea is suffering from a severe drop of its electrification rate.

In Guinea, electric power tariffs are fixed by joint order of the Ministry of Energy and Hydraulic (MEH) and the Ministry of Economy and Finance. The electricity tariffs of Guinea are presented in Table 4.

TABLE 2

Existing Electric Power Production Facilities

TYPE	PRODUCTION CAPACITY (MW)
Thermal Production (interconnected)	99,5
Hydroelectricity	127,16
Other Thermal Production Units (not interconnected)	12,26
TOTAL	238,92

Source: IDEACONSULT: LPDSE, as of 2006

TABLE 3

Thermal Production Cost Structure (per kWh)

DESIGNATION (2006 SITUATION)	COST PER kWh (EURO)	% OF TOTAL COSTS
Procurement of fuel	0,0302 €	33 %
Operation and maintenance	0,0064 €	7 %
Personnel costs	0,0093 €	10 %
Financial charges	0,0032 €	3 %
Depreciation expenses	0,0125 €	13 %
Provision	0,0306 €	33 %
Taxes	0,0006 €	1 %
Total costs	0,0928 €	100

Source: IDEACONSULT: LPDSE, as of 2006

TABLE 4

Electricity Tariffs of Guinea

TYPE OF USAGE	POWER RANGE KWH	KWH COST IN EURO	OBSERVATIONS
Domestic LV	1 to 60	0,014 €	Fixed premium = 0,739 Euro
	61 to 330	0,035 €	
	330	0,040 €	Three-phase fixed premium = 2,218 Euro
Professional, commercial and industries LV	1 – 330	0,122 €	fixed premium = 0,798 Euro
	330	0,197 €	Three-phase fixed premium = 2,396 Euro
Private and industrial MV/HV- Contracted load in kVA: 6312	Unique	0,197 €	
International institutions, NGO, embassies MV/LV Single-phase connection: 0,798 € Three-phase connection: 2,396 € Contracted load in kVA: 0,962 €	Unique	0,224 €	
Administration LV, MV, HV	Unique	0,271 €	

Source: EDG, as of 2008

Petroleum Sector

Up to now, Guinea does not have any confirmed hydrocarbon reserves. However, there are some ongoing research activities at various sites of the country. The bulk of the country's demand is covered by imports of hydrocarbons, estimated at 800,000 tons of petroleum, oils and lubricants in 2008 (excluding mining companies' consumption). As a result of the political disengagement of the Government in the productive and commercial sectors, there are four international petroleum companies: TOTALFINAELF, SHELL, MOBIL-OIL and Guinean company PETROGUI share the distribution market. The Guinean Petroleum Company (SGP) manages the deposits. All petroleum products consumed in Guinea are imported. In 2005, imports reached a total of 692,286 metric tons, as opposed to 727,820 metric tons in 2004 and 721,727 metric tons in 2003. Guinea also imports small quantities of Liquefied Petroleum Gas (LPG) equaling 316 tons in 2005; its relatively high price can only be afforded by the wealthiest of buyers. All the petroleum products consumed in Guinea are imported. Table 5 summarizes the imports from 1989 to 2003.

The transportation sector is the major consumer of petroleum products, with 52.2 % of total consumption. The products being consumed are divided into 54 % of gasoline, 36 % of diesel and 10 % of kerosene. The mining sector holds the second position with a consumption of more than 80 % of fuel oil. Petroleum products are distributed via the deposits owned by the Guinean Petroleum Company (SGP) and through a gas station network of various companies and privates distributors. Mining companies have their own storage capacities (company CBG: 50,000 m³, Friguia: 57,000 m³) and network of gas stations.

The prices of the different petroleum products are set for the whole country by decision of the Ministry of Commerce. The structure of prices is revised through the Economic and Financial Coordination Committee in its monthly technical support unit meeting. The selling price at the individual fuel pumps changes periodically according to the price fluctuation on the international market. The price increase in 2005 has been the last adjustment of retail prices since 1992. At present, the official retail prices are fixed at 0.60 €/liter of gasoline, 0.53 €/liter of diesel and 0.53 €/liter of kerosene. The stability of the retail price does, however, not prevent some of its determinants from varying from one month to another as the retail prices are subject to the fluctuations of the supply prices. The operating charges and different taxes, except for the Special Taxes on Petroleum Products (TSPP), are determined as a function of the price. The TSPP has been adjusted to the decrease and is presently fixed at 0.54 €/liter for gasoline, 0.037 €/liter for diesel and 0.024 €/liter for kerosene. Table 7 provides an overview of the current fuel prices.

TABLE 5

Imports of Petroleum Products (Metric Tons)

YEAR	GASOLINE	KEROSENE	DIESEL	FUEL OIL	TOTAL
1989	58,345	11,142	100,490	317,715	487,692
1990	75,948	8,565	91,772	334,551	510,836
1991	66,659	17,724	85,113	306,338	475,834
1992	57,321	37,940	97,016	286,360	478,637
1993	77,178	55,717	151,524	295,512	579,931
1994	78,700	45,784	126,041	315,477	567,002
1995	98,567	50,778	113,045	311,817	574,207
1996	101,519	45,497	132,025	323,767	602,808
1997	108,432	31,426	160,798	342,551	743,307
1998	96,732	26,941	154,982	344,299	622,954
1999	108,500	25,802	182,215	324,125	640,642
2000	74,181	24,122	139,242	362,183	599,728
2001	81,481	20,606	174,517	405,110	691,714
2002	74,579	21,890	201,723	420,705	718,897
2003	99,891	28,875	234,944	462,776	827,486

Source: UNDP, 2004

TABLE 6

Current Fuel Prices

YEAR	GASOLINE (€/LITER)	DIESEL (€/LITER)	KEROSENE (€/LITER)
2008	1.07	1.07	1.07
2009	0.74	0.74	0.74

Source: Ministry of Commerce, as of 2009

Biomass Sector

As it is the case in most West African countries, the energy balance of Guinea is highly dominated by the use of fuel woods (wood, charcoal). This is why biomass resources are ranking at the top of the country's energy resources. Despite of the high predominance of fuel woods in the energy balance of the country, its potential remains unknown. No comprehensive studies covering the entire national territory were conducted to assess the available potential. Due to several estimates[3], the accessible volume is about 8.5 million to 14 million m³. Table 8 presents the current status of disposable woodland areas. Table 9 summarizes the accessible volume of wood energy for production.

TABLE 7

Current Status of Disposable Woodland Areas in Guinea

TYPE OF FORMATION	SURFACE (1,000 HA)	%
Mangrove swamps	250	1.02
Moist forests	700	2.85
Open woodland forest and tropical forest	1,600	6.51
Savanna woodland	10,636	43.25
Sub-total wood formations	**13,186**	**53.63**
Fallow lands and tree and bush savanna	7,500	30.51
Total forest wood formations	20,686	84.14
Agricultural utilization	1,700	6.10
Others	2,200	9.76
Total	**24,586**	**100**

Source: World Bank/RPTES – Final Report Guinea, as of 1998

TABLE 8

Accessible Volume of Wood Energy

TYPE	SURFACE (1,000 ha)	GROSS PRODUCTION m³	ACCESS AND USE m³
Mangrove swamps	260	1,690.0	338.0
Tropical rainforest	800	3,200.0	640.0
Open woodland forest	2,700	4,250.0	1,700.0
Savanna woodland and tree and bush savanna	12,000	18,000.0	9.000.0
Bush and fallow land	6,150	412.5	2,063.0

Source: World Bank/RPTES – Final Report Guinea, as of 1998

As to the distribution of the forestry resources, the data show a highly imbalanced distribution from one region to the other. The very low national coverage ratio (4.8 %) testifies a significant discrepancy as compared to the ecologically recommended standard (30 %). Due to this situation, there are various considerations how to create stronger awareness and policies for sustainable wood energy management.

3 WORLD BANK/RPTES REPORT AND OTHERS

2.3 MARKET ACTORS AND REGULATION STRUCTURES

The **Ministry of Energy and Hydraulics (MEH)** is the governmental authority responsible for the energy sector. The sector management, however, is shared with other ministerial departments involved in the various segments related to the energy sector:

- The **Ministry of Environment** is in charge of water and forestry issues, thus playing an important role in the constituent dealing with traditional domestic wood fuel (biomass).
- The **Ministry of Mines and Geology** is in charge of oil prospection, thus managing the upstream segment of the hydrocarbon sector.
- The **Ministry of Commerce and Competitiveness** manages the downstream segment of the hydrocarbon sector.
- The **Ministry of Economy and Finance** plays a transversal role and is related to all governmental actions and segments in the energy sector.

The **National Division of Energy (NDE – Direction Nationale de l'Énergie – DNE)** is responsible for defining and conducting the country's energy related policy, except policy concerning hydrocarbons. The NDE comprises two divisions: the **Energy Planning and Regulation Division and the Renewable Energies Division**. A third division **(Division of Electricity)** was being planned when the study team visited the country in November 2008. The Energy Planning and Regulation Division comprises three sections: i) the Planning and Energetic Infrastructures Section, ii) the Regulation Section and iii) the Project Preparation Section. The Renewable Energies Division consists of four sections as depicted in the organizational chart presented below. Biofuels will be assigned to the bioenergy section in the course of the planned internal restructuring.

Biomass Sector

One of the characteristics of the traditional energies sector in Guinea is the fact that there have been but few stately interventions. Two departments are directly involved in this sector, namely the **MEH** for energy demand side aspects and the **Ministry of Agriculture, Waters and Forests (MAWF)** for offer aspects:

- As for the **MEH**, the strategy adopted for the Program of Economic and Financial Development includes a restructuring of the conventional, carbon-based energies sector through the improvement of management and operation structures and the development of a favorable environment for private investments. Up to now, however, traditional energies have not been taken into account.
- In the forestry domain, most of the programs aiming at the protection of the environment failed to integrate the energy dimension of the wood. The programs' priority was to fight soil erosion, forest fires and deforestation. What indeed has been constituted as a priority is the protection of inshore water bodies of the Fouta Djallon region[4], as well as essential activities for the preservation of the country's agricultural potential and ecological equilibrium.

4 MOUNTAINOUS REGION OF WEST-CENTRAL GUINEA, WHICH ALSO SERVES AS WATERSHED FOR SOME OF WESTERN AFRICA'S GREATEST RIVERS

- **The National Division of Water and Forestry (DNEF)** under the ministry in charge of forestry (MAWF) is responsible for the fuel woods production sub-sector (energy woods) without having any real organic relation with the DNE under the MHE. All offer-related energy wood issues – as mentioned already above – are handled by this division namely the development of strategies and the realization of forestry projects and programs.

Electricity Sector

The legal base for the electricity sector has been established by the laws of 1993 and by Law L/98/012[5] of June 1st 1998 relating to the foundation, construction, operation, maintenance and transfer of production infrastructures. The first section of this law defines institutions in charge of the management of the sector as well as their respective roles. These are:

- The **MEH** is in charge of the supervision, control and regulation of the sector. It defines and implements the energy policy and the structure of the tariffs.
- The **National Council for Electricity** acts as consultative organ. It consists of representatives of several ministerial departments, delegates of the dealers, the representatives of consumers and independent experts. The council is the instrument of mediation between the various actors of the electricity sector.
- The **Electricité de Guinée (EDG) Company** is in charge of the electricity sector.
- The **Electricity Sector Regulatory Body** was created in September 2005. It still lacks a clear definition of its mission.

Between 1994 and 2001, the electric power sector was managed by two companies: ENELGUI, the state owned company in charge of managing the electric power production and infrastructure, and the operating company SOGEL in charge of electric power transport and distribution. This organizational sub-division resulting from various reforms did, however, not meet the Government's expectations and ended with the termination of SOGEL's lease in October 2001. Since then, EDG, a business corporation established by the Government with the State as a majority shareholder, has been managing the sector. EDG is managing the capital and operation related rights and obligations and is responsible for the maintenance, restoration and development of electric power production, transportation and distribution facilities and equipment in order to guarantee public electric power service.

Petroleum Sector

In the petroleum sector of Guinea, the energy reform was implemented in 1992 thus permitting a thorough restructuring on the institutional level and allowing the transfer of storage, transport and distribution of petroleum products to private operator. Along this process,, an upstream regulation of the petroleum sector was implemented to ensure the technical control of the petroleum companies operating in Guinea. A regulatory framework body has been adopted and established by the Government for controlling and supervising compliance with these regulations. This implementation was done in cooperation with the World Bank[6].

In 2005, these structures have slightly been changed by an alteration of the responsibilities of the Ministries of reference and the National Directions that depend on this sector. For example, research is currently in the hands of the **National Direction of Oil Research** (belonging to the Ministry of Mine and Geology). The technical control of oil setups is performed by the **National Direction of Hydrocarbons** (belonging to the Ministry of Energy and Hydraulics). This direction is also responsible for addressing the country's need for oil products and is in charge of issuing the certificates of conformity and validation for the establishment of gas stations and fuel storage tanks. The **National Direction of Energy** (belonging to the Ministry of Energy and Hydraulics) is responsible for the oil product sector. This includes the compilation of consumption figures, import statistics and overall information on sector-related policies.

The oil imports are managed by the **Importing Committee** consisting of representatives of oil companies, the ministries in charge of commerce and finance, the Central Bank and the Government. The role of the committee is to define the quantities to be imported and to process calls to tender in order to acquire oil products.

The storage of oil products is in the hands of the Guinean Oil Company (SGP). The company is responsible for handling, storage and wholesale shipping of oil products. Transportation and distribution are performed by oil companies (Totalfinal, Shell and Petrogui) and by private Guinean companies. The **Ministry of Economy and Finance** is responsible for the collection of various taxes and is heading the Importing Committee. The official retail prices are fixed by order of the **Ministry of Commerce and Competitiveness**. The **Ministry of Mines and Geology** promotes the exploration of potential oil resources. Activities in this direction started in 1974 with the establishment of the Société Guinéenne des Pétroles (SOGUIP – Guinea Oil Society). Up to now, these activities have brought no tangible results despite promising findings in bordering countries. At present, there are no proven oil reserves in Guinea.

3 POLICY FRAMEWORK FOR RENEWABLE ENERGIES

3.1 POLICIES, STRATEGIES AND PROGRAMS FOR RENEWABLE ENERGY PROMOTION

Up to now, there is no institutional framework for Renewable Energies (RE). In general, however, the RE sector is subject to the same regulations as the other energy sectors. Thus, the energy sector policy document of 1992 (LPDSE 92) can be considered as the so far appropriate RE development policy framework in force in Guinea, also referring to RE related

5 SEE ALSO WEBSITE OF DROIT AFRIQUE WWW.DROIT-AFRIQUE.COM/INDEX.PHP/CONTENT/VIEW/104/220, AS OF 2009

6 SEE WEBSITE WORLD BANK: › COUNTRIES › AFRICA › GUINEA › PROJECTS & PROGRAMS › ALL PROJECTS (HTTP://WEB.WORLDBANK.ORG/EXTERNAL/DEFAULT/MAIN?MENUPK=351830&PAGEPK=141143&PIPK=399272&THESITEPK=351795), AS OF 2009

institutional aspects. A new policy document for the energy sector is being prepared (as of 2008[7]). It will be based on the new Electrification Master Plan that is under validation.

Since 2008, an energy sector development policy document is under preparation and validation. It is based on the achievements of the past few years resulting from major reforms in the energy sector and on the data compiled in the Electrification Master Plan. The DNEF is implementing several forestry programs and projects operating with wood energy components. It promotes natural vegetation development actions (moist forest and mangrove swamps), state controlled reforestation as well as community-based and private reforestation in order to enhance the production. On the political and statutory scale, the DNEF established a forestry policy document (in 1988) along with a six year Action Plan and Forestry Code[8] (in 1989), which are currently the major forestry resources' management tools (that need to be updated).

The Poverty Reduction Strategy Paper (PRSP)[9], passed in 2002, only considers the electric power sector in terms of basic infrastructures and accelerated economic growth. The proceeded PRSP revision is also an opportunity for the better consideration and integration of all energy sub-sectors (not only the electricity sector) within the PRSP in order to cope with the urgent demand for energy services and access in Guinea.

The ECOWAS Energy Services Access Program is part of the active membership of Guinea within the ECOWAS (Economic Community of West African States). With support of UNDP (through its Poverty Reduction Program (PREP), based in Dakar, Senegal) multisectoral consultations on the implementation of the objectives defined in the ECOWAS White Book in Guinea have been set up. At 20 September 2005, Order No 4545/MHE/SGG/2005[10] established the National Multisectoral Group (NMG) by defining its composition, its objectives and its attributes. The objectives of the NMG are defined as follows:

- Review the existing institutional and strategic framework for energy services and poverty reduction
- Analyze the national energy status in order to define an energy service access vision for Guinea
- Define the long-term objectives for energy services access at the national level
- Assess necessary investments

3.2 REGULATIONS, INCENTIVES AND LEGISLATIVE FRAMEWORK CONDITIONS

All regulations, incentives and legislative framework conditions are defined by the MEH and the Decentralized Rural Electrification Office (Bureau Electrification Rural Décentralisé – BERD). While the Ministry coordinates all energy sector specific regulations, the BERD executes a program designed to enhance the access to modern energy services in rural areas of Guinea. The project started in 2003 and was finished in December 2008.

Currently the emphasis of the Decentralized Rural Electrification Office is on training activities for private players operating energy services at decentralized sites. The training units consist of promotional activities, onsite technical capacity building and the provision of adequate calculation and management tools. So far, ten consulting companies and around twenty electrification operators were trained on RE projects' implementation. The overall incentives included the electrification of ten sites through "pico-diesel networks"[11] and the electrification of three sites via installation of PV solar kits. The PV incentive includes three service levels. The first level includes two solar lights (30 Wp), the second two lights plus one alternating current socket (60 Wp) and the third three lights plus one alternating current socket (90 Wp). Table 9 summarizes the RE achievements of Guinea.

TABLE 9

RE Achievements in Guinea

SYSTEM	IMPLEMENTED NUMBER	IMPLEMENTATION PERIOD	COST IN 1,000 USD	DONOR	OPERATING STATUS
Solar/photovoltaic	800 kWp	1984–2008	10,000	EU, WB GTZ , GTZ, R.W, USAID, RW	80 %
Biogas	92	1977–2004	59	China, EU, IEPF, Etat	30 %
Micro Hydro Power plant	2	1983–2004	2,500	North Korea, Canada	80 %
Wind pump	2	1990–2004	5	EU, MSF, China	60 %
Biomass (wood saving) – fuel saving oven		1992–2004	2,000	EU	85 %

Source: LPDSE, as of 2008

7 IDEACONSULT, AS OF 2008
8 DROIT AFRIQUE, AS OF 2009
9 IMF/GUINEAN GOVERNMENT, 2002; SEE ALSO LATEST PRSP VERSION: IMF/GUINEAN MINISTRY OF THE ECONOMY, FINANCES AND PLANNING, AS OF 2007
10 DROIT AFRIQUE, AS OF 2009
11 THE TERM 'PICO' CHARACTERIZES A VERY SMALL DIESEL-BASED ELECTRICITY NETWORKS OR GRIDS.

Between 2004 and 2008, further incentives contributed significantly to the increase of RE utilization. This includes the implementation of 800 kWp at health care centers, solar pumping facilities, street lighting and some private households.

In the field of hydroelectricity, governmental incentives started feasibility studies at 13 target sites with a total capacity of 23.6 MW. The so called "hydraulic ram program" aimed at installing ten hydraulic rams to supply 5 m³ of water per day for the supply of villages with 500 inhabitants in Middle Guinea. This program was very promising in the beginning, but was finally shut down due to lack of sustainability.

4 STATUS AND POTENTIAL FOR RENEWABLE ENERGIES

4.1 BIOMASS/BIOGAS

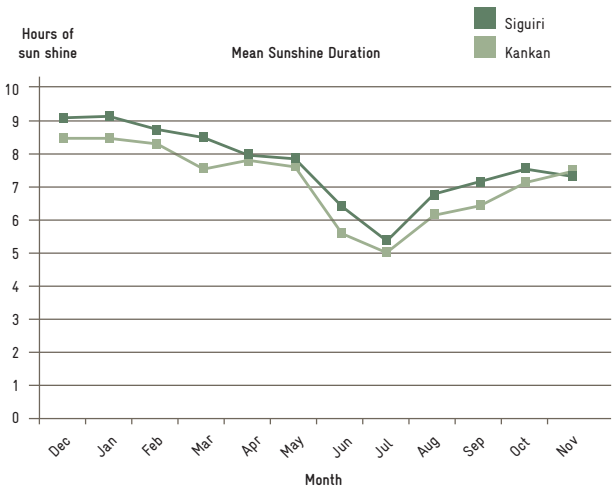
The biomass potential in Guinea is essentially based on wood energy. Despite the high predominance of fuel woods (wood and charcoal) in the energy balance of the country, its actual potential remains unknown. No comprehensive studies covering the whole national territory were conducted to assess the available potential. According to various estimations[12], the accessible volume is about 8.5 million to 14 million m³.

4.2 SOLAR ENERGY

The assessment of the Guinean solar power potential lacks a systematic and concise approach and structure. The information available indicates an average annual insolation at the rate of 4.8 kWh/m² per day and a mean sunshine duration of 2,700 hours per year (as almost encountered at the location of Kankan in High Guinea). The figures clearly demonstrate that the solar potential is considerable throughout the territory. Figure 10 provides information on the specific sunshine duration of Guinea.

FIGURE 10

Sunshine Duration in Guinea



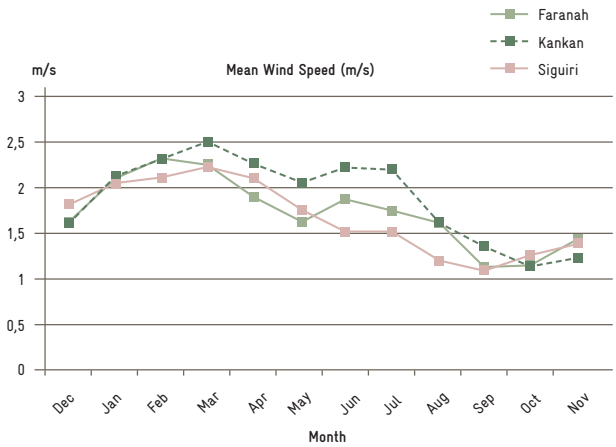
Source: DNE/Bah, as of 2007

4.3 WIND POWER

The assessment of the Guinean wind power potential likewise lacks a systematic and concise approach. The data indicating the average annual wind velocity range from 2 to 4 m/s in Maritime Guinea and Middle Guinea. Such poor potential does not allow for overall exploitation. It is, however, possible to use wind energy for pumping systems using mechanic windmills. Figure 11 indicates the mean wind speed at different sites.

FIGURE 11

Mean Wind Speed (m/s)



Source: DNE/Bah, as of 2007

4.4 HYDRO POWER

Guinea has a considerable Hydro Power potential of about 6,000 MW that corresponds to an annual ensured production capacity of 19.300 GWh. Up to now, only 2 % of the available potential is being exploited. The regional distribution of the national Hydro Power potential is presented in Table 10. Table 11 presents the distribution of actual Hydro Power production sites. Figure 12 indicates the location of Hydro Power production sites.

TABLE 10

Regional Distribution of the Hydro Power Potential

REGION	CAPACITY (MW)	%
Maritime Guinea	2,800	47 %
Middle Guinea	2,600	43 %
High Guinea	500	8 %
Forested Guinea	100	2 %
Total	6,000	100 %

Source: LPDSE, as of 2008

The Hydro Power potential is high throughout the whole of Guinea. Potential sites are classified below according to their related expected productive power:

- Four sites with a potential productive power exceeding 200 MW: Amaria (665 MW), Souapiti (515 MW), Koukoutamba (281 MW), Kaleta (240 MW)
- Three sites with a potential power of 150 MW to 200 MW
- Ten sites with a potential power of 100 to 150 MW

12 WORLD BANK/RPTES REPORT AND OTHERS

- Sixteen sites with a potential power of 50 to 100 MW
- Forty-eight sites with a potential power of 10 and to MW
- Thirty-seven sites with a potential power under 10 MW

TABLE 11

Distribution of Hydro Power Production Sites

REGION	NUMBER OF SITES	TOTAL CAPACITY (kW)
Middle Guinea	53	18,510
Forested Guinea	33	19,150
Maritime Guinea	28	15,610
High Guinea	16	4,220
Total	130	54,490

Source: LPDSE, as of 2008

5 MARKET RISKS AND BARRIERS

The lack of appropriate institutional framework is one of the major risks constraining the development of the RE market. At present, the sector's development remains highly dependent on the establishment of an intervention framework promoting private operators' involvement. Consequently, approval of a new LPDSE taking into account the whole of the current reference frameworks (PSRP, MDGs, PDE, ECOWAS, etc.) is a must to secure the sector's future. In addition, the political stability of the country also represents a risk constraining the country's economic growth in general and the energy sector's growth in particular. The development of the RE market is constrained by several factors:

- Institutional constraints: The energy sector's institutional frame does not authoritatively take RE into account. It is, however, expected that its current development will overcome this constraint.
- Financial constraints: Due to the lack of appropriate financing mechanisms, access costs for RE, namely solar equipment (initial investment), remain very high.
- Fiscal constraints: Currently, there are no fiscal incentives supporting RE.
- Socioeconomic constraints: The overall income level is rather poor.

In order to promote and encourage investments in the major development objectives, Guinea has established an investment code (Law L/95/029/CTRN of 6/30/1995). This law stipulates that anybody is allowed to take up commercial, industrial, mining, farming and service provision activities in the territory of the Republic of Guinea as long as the activities comply with the laws and regulations of the Republic. With regard to exchange regulations, the code guarantees investors the possibility to transfer their profits in convertible currency to any destination of their choice. The investment code also protects private investments against any expropriation attempts for nationalization purposes. In addition to those guarantees offered to private investors, the code provides major fiscal benefits (e.g. exemption in the first year of investment, reduction of tax base etc.) for investments in priority fields and areas targeted by the code. Table 12 presents Guinea's position within the Ease of Doing Business ranking.

TABLE 12

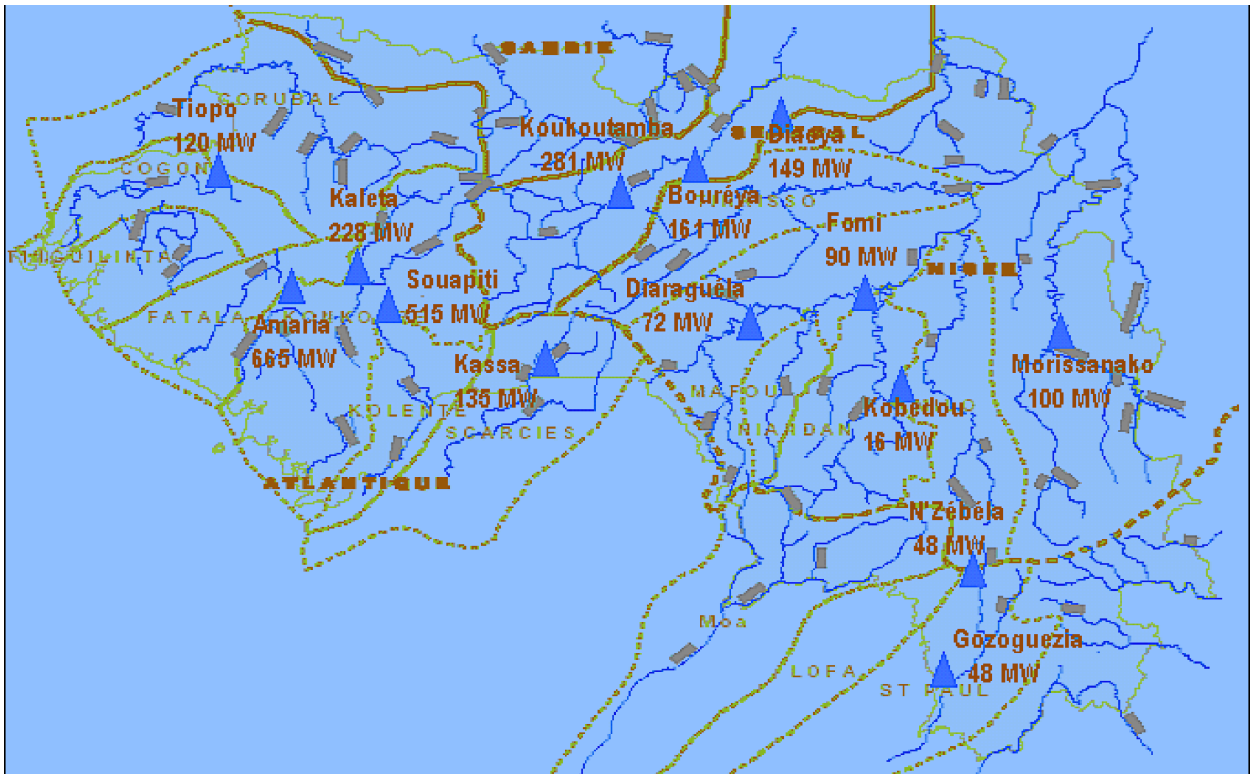
Ease of Doing Business Ranking

SELECTED INDICATOR	RANKING
Doing business	171
Starting a business	177
Dealing with construction permits	162
Employing workers	114
Registering property	157
Getting credit	163
Protecting investors	170
Paying taxes	168
Trading across borders	110
Enforcing contracts	131
Closing a business	109

Source: World Bank Group/International Finance Corporation – IFC, as of 2009

FIGURE 12

Location of Hydro Power Production Sites



Source: LPDSE, Cartographies Potential Hydro Power Dams in Guinea, as of 2008

6 RENEWABLE ENERGY BUSINESS INFORMATION AND CONTACTS

TABLE 13

Key Actors in the Field of Energy in Guinea

INSTITUTION	ADDRESS	PROFILE
Ministry of Hydraulics and Energy – MEH	BP 1217 Conakry, Guinea Phone: +224 30 45 10 65 Fax: +224 30 45 10 71	Administrative authority responsible for the institutional management of the entire energy sector
The Rural Electrification Decentralized Office – BERD	Villa 30 Cité des Nations BP 3186 Conakry, Guinea Phone: +224 30 43 14 98 Fax: +224 30 43 15 08 nava.toure@berd.org.gn	A project funded by the World Bank, the GEF and the Guinean Government designed to implement decentralized rural electrification strategies
Electricité de Guinée – EDG	B.P : 1463 Conakry, République de Guinée Tel : +224 - 60-59-88-28 ou 30-45-43-09 ou 60-25-75-23 ou 60-25-27-57 ou 60-25-31-20	Public corporation in charge of public electric power service throughout Guinea
SES	BP 2952, Conakry, Guinea Phone: +224 60 22 18 76 sesplus.guinee@yahoo.fr	Private company involved in solar equipment sale
Guinea Solar	n.a.	Private company involved in solar equipment sale
AGUIPER	n.a.	Guinean Association for the promotion of RE
TOPERGUI	n.a.	Rural electrification lease holder

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