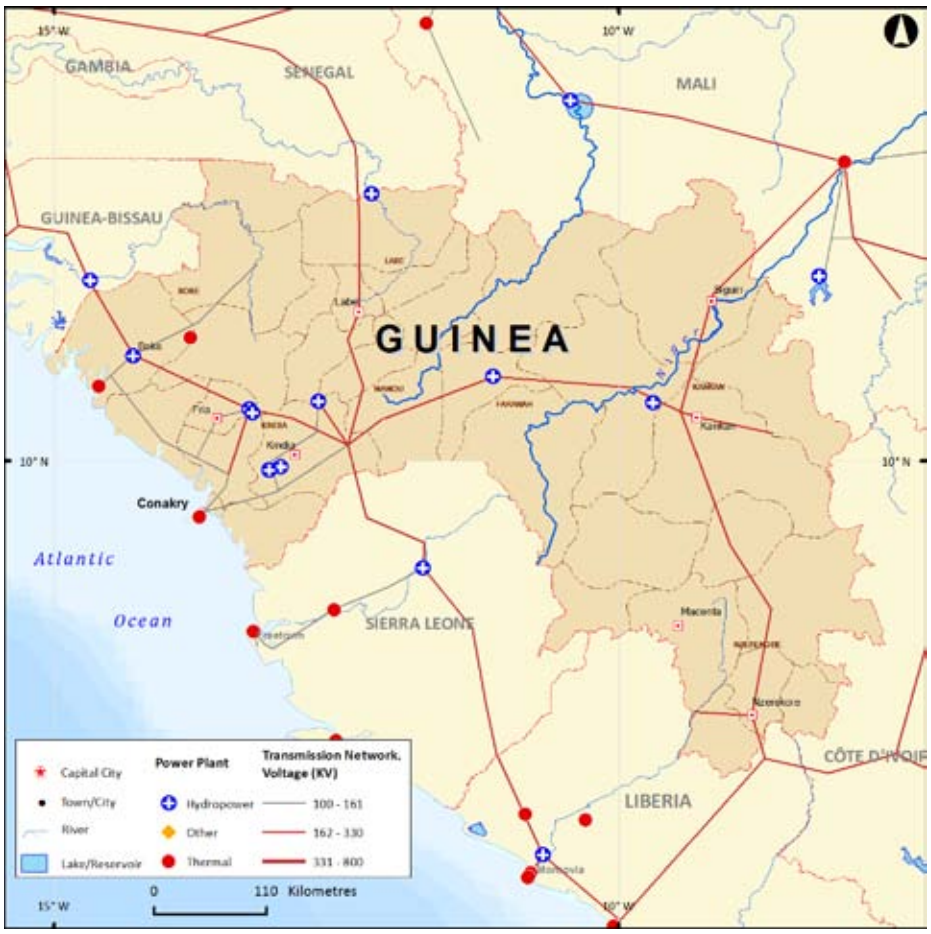
Guinea

Figure 1: Energy profile of Guinea



Energy Consumption and Production

Guinea had a poulation of 11.94 in 2013 (Table 1) (World Bank, 2016). In 2015, total production of electricity was 109 ktoe with 43.1 per cent produced from fossil fuels and 55.9 per cent from hydro sources (Table 2). Final consumption of electricity is 95 ktoe (AFREC, 2015). Key consumption and production statistics are shown in Figures 2 and 3.

Table 1: Guinea's key indicators

Key indicators	Amount
Population (million)	11.94
GDP (billion 2005 USD)	3.61
CO_2 emission (Mt of CO_2)	2.59

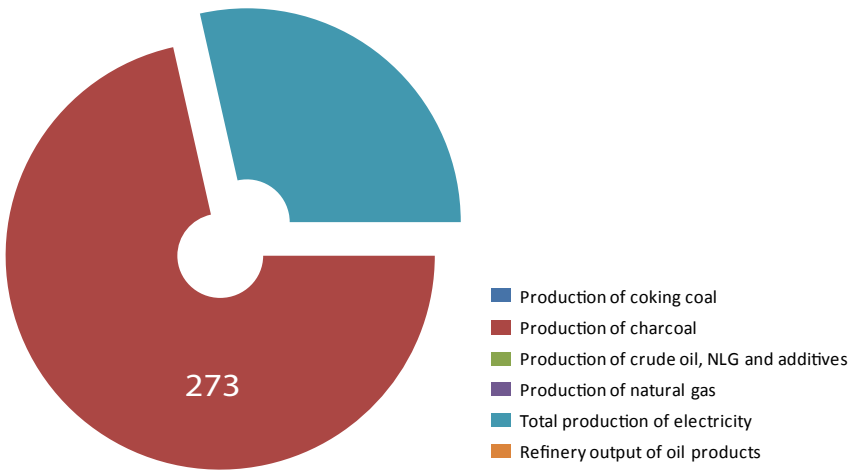
Source: (World Bank, 2015)

Energy Resources

Biomass

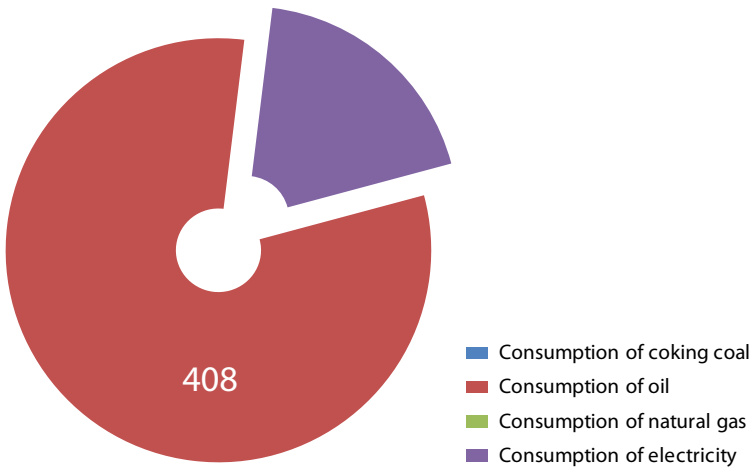
There is a dearth of information on the actual volume of Guinea's biomass potential with some estimates averaging 8.5 to 14 million m^3 in accessible biomass volume (REEEP, 2012). However, like in other African nations, wood and charcoal play a big part in the country's energy balance. In 2015, production of charcoal amounted to 273 ktoe (AFREC, 2015).

Figure 2: Total energy production, (ktoe)



Source: (AFREC, 2015)

Figure 3: Total energy consumption, (ktoe)



Source: (AFREC, 2015)

UNICEF in Guinea / Flickr.com / CC BY-NC2.0

Solar panels power refrigerators for vaccines

Table 2: Total energy statistics (ktoe)

Category	2000	2005	2010	2015 P
Production of coking coal	-	-	-	-
Production of charcoal	0	0	0	273
Production of crude oil, NLG and additives	-	-	-	-
Production of natural gas	-	-	-	-
Production of electricity from biofuels and waste	0	0	0	0
Production of electricity from fossil fuels	29	34	39	47
Production of nuclear electricity	-	-	-	-
Production of hydro electricity	35	42	45	61
Production of geothermal electricity	-	-	-	-
Production of electricity from solar, wind, Etc.	0	0	0	1
Total production of electricity	64	76	83	109
Refinery output of oil products	-	-	-	-
Final Consumption of coking coal	-	-	-	-
Final consumption of oil	412	439	456	408
Final consumption of natural gas	-	-	-	-
Final consumption of electricity	59	70	77	95
Consumption of oil in industry	0	0	0	0
Consumption of natural gas in industry	-	-	-	-
Consumption of electricity in industry	0	0	4	35
Consumption of coking coal in industry	-	-	-	-
Consumption of oil in transport	0	0	0	0
Consumption of electricity in transport	-	-	-	-
Net imports of coking coal	-	-	-	-
Net imports of crude oil, NGL, Etc.	-	-	-	-
Net imports of oil product	412	442	469	499
Net imports of natural gas	-	-	-	-
Net imports of electricity	-	-	-	-

(AFREC, 2015)

- : Data not applicable
0 : Data not available
(P): Projected

Hydropower

Guinea has considerable potential for hydropower generation, with the gross theoretical capability estimated at 26,000 GWh/year, 40 per cent of which lies in the Konkoure River basin (REEEP, 2012). There is thus the option of substituting expensive thermal generation with relatively cleaner hydroelectricity (WEC, 2013). However, this will require much support and investment commitment from the government. The installed hydroelectric capacity in 2011 was 75 MW, with a further 80 MW under construction (WEC, 2013). The coastal region holds most (46 per cent) of the hydro-generation potential followed by the mountainous area near the Fouta-Djalon which have a potential of 43 per cent (WEC, 2013).

Oil and natural gas

At the end of 2011, the estimated recoverable oil reserves were 1,700 and million barrels of oil.

Peat

There are 1,952 km^2 of peatland (WEC, 2013).

Tidal power

In 2013, the Wave Electricity Renewable Power Ocean (WERPO) company of Israel signed an MOU with the government to build a 100 MW tidal power plant in Conakry (Energy Mix Report, 2013).

Wind

Data is limited as to wind power potential, but it is suggested that the mean wind speeds ialong the coast and in the central part of the country are between 2 to 4 m/s annually. This may be too low for large-scale wind power production, but could be used for smaller applications such as water pumps (REEEP, 2012).

Geothermal

No study has been done to assess the geothermal potential of Guinea (REEEP, 2012).

Solar

There is a dearth of information on the potential of solar power in Guinea. However, REEEP (2012) indicates a mean annual insolation of just under 5 kWh/ m^2/day and sunshine duration averaging 2,700 hours a year, indicating commercial viability. By 2015, the production of electricity from solar and wind was estimated at 1 ktoe (AFREC, 2015).

Tracking progress towards sustainable energy for all (SE4All)

There are a number of challenges in the sector, including unending load shedding, inadequate distribution networks, with a loss rate of 49 per cent , and poor management of the national electricity company; these have conspired to leave Guinea with a very low national electrification rate of 26.2 per cent (Table 3) (World Bank, 2016). Access to electricity in rural areas is only 2.9 per cent compared to 74.2 per cent in urban areas (World Bank, 2016). In fact, many of the micro-hydro dams located outside the capital city that were built before 1960 are only operational due to the ingenuity of local engineers. Access to modern fuels is low with most households using firewood and charcoal for cooking (REEEP, 2012). In 2012, only 2 per cent of people in rural areas were using non-solid fuels and just 3 per cent in urban areas (World Bank, 2015).

The energy intensity (the ratio of the quantity of energy consumption per unit of economic output) was 15.1 MJ per US dollar (2005 dollars at PPP) in 2012. The compound annual growth rate (CAGR) between 2010 and 2012 was -0.24 (World Bank, 2015).

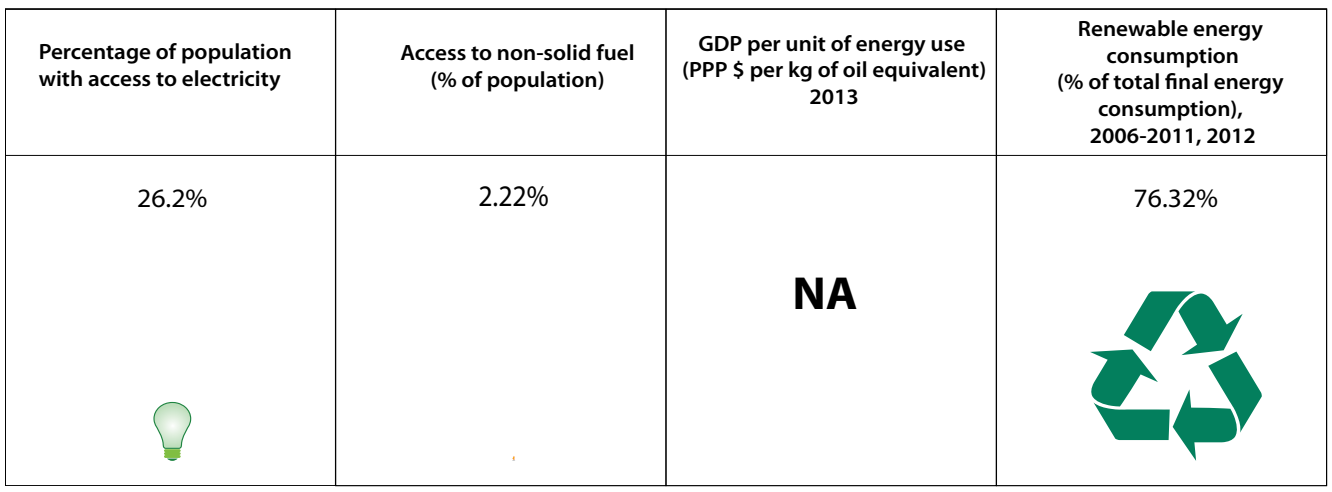
The share of renewable energy in the total final energy consumption (TFEC) decreased slightly from 92.6 to 74.1 per cent between 1990 and 2012. Traditional solid biofuels form the biggest share of renewable sources at 72.8 per cent of TFEC in 2012, while modern solid biofuels contributed only 0.5 per cent and hydro 0.8 per cent . Renewable sources contributed 28.4 per cent share of electricity generation in 2012 (World Bank, 2015).

Table 3: Guinea's progress towards achieving SDG7 – Ensure access to affordable, reliable, sustainable and modern energy for all

Target	Indicators	Year					
		1990	2000	2010	2012	2000-2010	2011-2015
7.1 By 2030, ensure universal access to affordable, reliable and modern energy services	7.1.1 Per cent of population with access to electricity	14	16	20	26.2		
	7.1.2 Per cent of population with primary reliance on non-solid fuels	2	2	2	2.22		
7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1 Renewable energy share in the total final energy consumption	92.6	89.6	88.9	74.1		
7.3 By 2030, Double the rate of improvement of energy efficiency	7.3.1 GDP per unit of energy use (constant 2011 PPP $ per kg of oil equivalent)						11.16 (2013)
	Level of primary energy intensity(MJ/$2005 PPP)	14.4		15.2	15.1	12.00	11.92

Sources: (World Bank, 2015); (World Bank, 2016)

Figure 4: SDG indicators



Magharebia / Foter / CC BY

Table 4: Guinea's key aspects/key mitigation measures to meet its energy Intended Nationally Determined Contributions (INDCs)

INDC
*Produce 30 per cent of energy (excluding wood-energy) from renewable energy sources.
*Commission hydro-power stations producing 1,650 MW (127 MW in 2011).
*Install an additional 47 MW (3 MW in 2011) of solar and wind power.
*Increase the supply of biofuels and other modern energies (40k toe of butane and biogas, 3000 kWc of biofuels).
*Support the dissemination of technologies and practices that are energy- efficient or use alternatives to wood-energy and charcoal.
* Reduce final demand for firewood and charcoal by 50 per cent per capita (in urban and rural areas) as compared to 2011.
*Improve the energy performance of the Guinean economy.
*Improve electricity yields by 50 per cent in relation to the baseline situation (2011).
*Reduce specific consumption of the transport, residential and public administration sectors by improving the quality of the transport fleet; promoting public transport; disseminating solar streetlamps and low-energy lamps and electrical appliances; and implementing efficiency standards in building design.

Sources: (World Bank, 2015); (World Bank, 2016)

Table 5: Guinea's institutional and legal framework

Basic Elements	Response
Presence of an Enabling Institutional Framework for sustainable energy development and services (Max 5 institutions) most critical ones	Ministry of Energy and Hydraulics (MEH)
Presence of a Functional Energy Regulator	Electricity Sector Regulatory Body 2005
Ownership of sectoral resources and markets (Electricity/ power market; liquid fuels and gas market)	
Level of participation in regional energy infrastructure (Power Pools) and institutional arrangements	West African Power Pool (WAPP)
Environment for Private Sector Participation	
Whether the Power Utility(ies) is/are vertically integrated or there is unbundling (list the Companies)	Electricity Corporation of Guinea (EDG)
Where oil and gas production exists, whether upstream services and operations are privatized or state-owned, or a mixture (extent) e.g., licensed private exploration and development companies)	Ministry of Mines and Geology
Extent to which Downstream services and operations are privatized or state-owned, or a mixture (extent)	National Directorate of Energy (Ministry of Energy and Hydraulics)
Presence of Functional (Feed in Tariffs) FIT systems	
Presence Functional IPPs and their contribution	
Legal, Policy and Strategy Frameworks	
Current enabling policies (including: RE; EE; private sector participation; & PPPs facilitation) (list 5 max) most critical ones	• Energy policy 2008 • Electrification Master Plan • Electricity Sector Efficiency Improvement Project
Current enabling laws/pieces of legislation (including: RE; EE; private sector participation; & PPPs facilitation) – including electricity/grid codes & oil codes (5 max or yes/no) most critical ones	• Petroleum Code has been introduced by the Law L/2014 /N°034/AN dated 23December 2014 • Electricity production laws of 1993 • Law L/98/012 of 1st June 1998.

This table was compiled with material from (REEEP, 2012)

Intended Nationally Determined Contributions (INDC) within the framework of the Paris climate Agreement

Guinea is rich in natural resources that make it a carbon sink. But these same resources are under threat from climate change. The government aims to protect these resources while at the same time helping to reduce its contribution to global climate change. To that end, the Intended Nationally Determined Contributions (INDCs)

Institutional and Legal Framework

The Ministry of Energy and Hydraulics (MEH) is in charge of the energy sector while the National Directorate of Energy defines policy (Table 5). The energy regulator is the Electricity Sector Regulatory Body 2005. The Electricity Corporation of Guinea (EDG) is the sole generator, transmitter and distributor of electric energy. On a regional level, the country is a member of West African Power Pool. The legal framework is provided by the electricity production laws of 1993 and by