

WORLD SMALL HYDROPOWER DEVELOPMENT REPORT 2013

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GUINEA



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1 Africa

1.5 Western Africa

1.5.5 Guinea

Susanne Hughes, International Center on Small Hydropower

Key facts

Population	10,884,958 ¹
Area	245,857 km ²
Climate	Generally hot and humid
Topography	Generally flat coastal plain, hilly to mountainous interior ¹
Rain pattern	Average annual precipitation is 4,418.5 mm. There are 160 days annually on which precipitation greater than 0.1 mm occur. Monsoonal-type rainy season: June to November (with southwesterly winds). Dry season: December to May (with northeastern Harmattan winds). ¹ Driest month is February with 0.5 mm. Wettest month is July with 1,327 mm. ²

Electricity sector overview

The national electrification rate of Guinea is around 17 per cent, with 14 per cent of the population with access to electricity living in urban areas and 3 per cent in rural areas.³ Another source reported that only about 10 per cent of the population in the capital, Conakry, and other small urban areas have access to electricity and water.⁴ Hydropower accounts for 95 per cent of the total renewable electricity production, at 36 per cent (figure 1). Out of the total electricity generation, 90 per cent is consumed by 25 per cent of the country's population living in Conakry.⁴ The provided electricity supply in Conakry and other urban areas remains insufficient.⁴

The Guinea Electrical Company (EDG), under the administration of the Ministry of Energy and Hydraulic, manages an installed power capacity of 150 MW.⁴ About 50 per cent of all electricity generation is now privately owned.⁵ The electricity is distributed via three interconnected grid-systems (Samou, Garafiri and Kinkon).

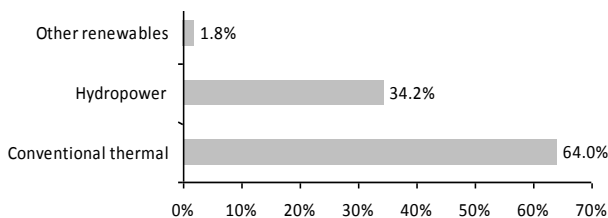


Figure 1 Electricity generation in Guinea

Source: World Atlas and Industry Guide⁵

A rural electrification project, partly financed by the African Development Bank, is being implemented (between 2011 and 2014), covering 31 localities, along the national interconnected grid. The Government has set an objective of raising the country's electrification rate to 36 per cent by the end of 2015.⁶ It is estimated that electricity demand will increase by 10 per cent annually over the next decade.⁵

In 2010, the Kouroussa Corporation made a commitment to fight poverty through the construction of a hydropower dam on the Cogon River, supplying the villages of Boke, Kamsar and Sangaredi with electricity. This hydropower plant is estimated to add a power capacity of 80 MW within five years.⁷ In 2011, the Prime Minister of the Guinean Government announced the news about the construction of a large hydropower plant at the Konkoure River (240.6 MW, 942 GWh) by the Chinese company China Water and Electric (CWE).⁸ Once the citizens of Guinea are supplied with the required electricity, the Government plans to export this precious resource to the neighbouring countries through inter-connected electrical grids. CWE has proceeded with the construction of the dam as well as promised to achieve 70 km of paved roads, to supply two villages with electricity and to create an electricity transmission line of 147 km.⁹

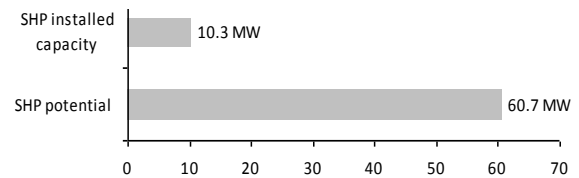


Figure 2 Small hydropower capacities in Guinea

Small hydropower sector overview and potential

There are seven small hydro plants with a total capacity of 10.31 MW in Guinea (figure 2). All of them need refurbishment. The following were recently reported to be operational: Kinkon (3.2 MW), Tinkisso (1.5 MW, 1967-1968) and Loffa (120 kW).⁹ There were plans to upgrade the Loffa plant to 2.8 MW.¹⁰

In a recent report by the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE), the total hydropower potential (≤ 30 MW) is 107 MW (in 18 sites).¹⁰ Out of those listed, 11 sites are < 10 MW and constitute a verifiable potential capacity of 24.668 MW.

Table 2

Micro hydropower sites in Guinea

<i>Number</i>	<i>Site</i>	<i>River</i>	<i>Prefecture</i>	<i>Installed capacity (kW)</i>	<i>Energy production Gwh/year</i>
1	Tolo	Tolo	Mamou	20	0.80
2	Djoundé	Bouroundou	Boké	30	1.80
3	Goléya	Soguisogui	Kindia	30	0.75
4	Moussayah	Kassogny	Forécariah	50	1.00
5	Tamagaly	Konkoure	Mamou	10	0.25
6	Pike	Pike	Dalaba	10	0.60
7	Kansagui	Sonki	Telimele	10	0.80
8	Sagalé	Tominé	Lélouma	10	0.30
9	Kassira	Kassira	Mali	60	0.36
10	Nimbéli	Koela	Koubia	60	0.38
11	Nongoa	Mafissa	Gueckedou	60	3.00
12	Wantaguala	Kondékhouré	Dinguiraye	28	1.68
13	Dabadou	Konowa	Kérouané	50	0.32
14	Para-Marela	Mongo	Faranah	20	0.14
15	Kamba	Kouliyire	Forecariyah	30	1.80
16	Kabiéta	Huwoya	N'Zérékoré	20	0.48
17	Ouin ouin	Loffa	Macenta	37	0.52
18	Sonofilako	Kourayé	Beyla	40	2.94
19	Guibaya	Makona	Macenta	30	1.00
20	Tabouna	Santa	Kindia	80	1.20
21	Tonon	Gouan	Lola	10	0.08
22	Donghol	Petedji	Labe	40	0.24
23	Nila	Labatou	Pita	10	0.06
24	Souessou 2	Souessou	Beyla	10	0.08
25	Lokoua	Loffa	N'Zerekore	50	0.50
26	Djounde	Bouroudou	Boke	30	0.18
27	Bossere	Doutou	Telimele	50	0.36
28	Banko	Bindibar	Dabola	60	0.50
29	Gountou	Gountouwol	Tougue	80	0.48
30	Pita	Lalia	Bambeta	60	0.36

Source: N'Faly and Barry¹¹

According to N'Faly and Barry (2006), there are 136 sites with potential capacities between 0.1 to 3 MW (total capacity 60.69 MW, 269.69 GWh). The priority lies with the small hydropower plants below 3 MW.¹¹

Global Environmental Facility (GEF) is financing a project called Promoting Development of Multi-purpose Mini Hydropower Systems (2012-2016) that addresses existing barriers to renewable energy and plans to establish a total of 800 kW hydropower generation capacities. Three small hydropower sites have been identified and selected by the Ministry of Energy, i.e. Touba (Gaoual), Seredou (Macenta) and Keno. More detailed feasibility studies are needed, but due to budget limitations, it is likely that only one of the plants will be built as a pilot demonstration site.¹²

Renewable energy policy

There is no policy on the promotion and development of renewable energy projects in Guinea. It targets a renewable energy penetration rate of 2 to 6 per cent in 2013 and 8 to 25 per cent in the long term (until 2019).¹³

Legislation on small hydropower

There is no established small hydropower legislation. In 1993, there was a regulating law initiative based on the Built Operate and Transfer (BOT) to favour the participation of private operators in the development of energy and hydropower, and a law established in 1998 to authorize private participation in financing, construction, development, maintenance and structural development in the energy and power sector.^{4 5}

Barriers to small hydropower development

Small and large hydropower plants have been an important part of the electricity sector, justified by the importance of the development of the industry and mine sector. Guinea has a wide range of hydropower resources which can be developed in a sustainable manner to provide grid connected and non-connected areas with all the needed electricity supplies.⁴ However, improvement must be made in areas as follows:

- Capacity building: The lack of adequate infrastructure for research and training of staff and supervisors of maintenance services of renewable

energy technologies in general and small hydropower in particular.³

- Developing the country's hydropower resources, in particular by promoting synergies between the mining and energy sectors, and continuing regional integration.⁵
- Upgrading the electricity grid to expand electricity access.
- Development of suitable and adapted legislation promoting the use of renewable energies including small hydropower as well as related implementation and creation of incentives.
- Further reforms in the electricity sector, with a view to achieving greater efficiency and encouraging private sector investment.⁵
- Financial mechanisms: Lack of financial resources due to the complex permitting and licensing process for renewable energy projects, with negative impact on the indices of development of renewable energy and on technology transfer.³

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