

# SLIEPA



Improving Investment and Facilitating Export.

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# SECTOR PROFILE

energy



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The energy sector is the pivot in the development of any nation and access to reliable and affordable modern energy is an important catalyst for achieving high economic growth and achieving the MDGs. A significant amount of progress has already been made over the past 5 years of decisive interventions in the sector. To date, the energy sector in Sierra Leone is still characterised by a significant level of unmet domestic and regional demand for power.

The country is, however, blessed with plentiful rainfall and sufficient topographic relief that creates substantial potential for hydro-power generation throughout the country. The country also has abundant sunlight, which is seasonal complementary to hydropower sources, thereby creating strong opportunities in solar power generation. The country's burgeoning bio-fuels sector has also received foreign direct investments. The Government of Sierra Leone has also demonstrated strong commitment and dedication to the establishing and expanding the sector, through a set of transparent policy measures.



The sector continues to face major challenges, which are being addressed within the context of the sector development strategies of Government. The key objectives therein are

- Reducing the cost of producing and distributing electricity, which are already very high
- Increasing access to permanent and reliable electricity supply for the majority of the population, who
- already do not have access to reliable electricity



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## THE ENERGY MARKET

The country's energy demands are massively underserved with conservative estimates of currently unmet demand continually increasing. As the country develops and becomes increasingly industrialised, especially with the development of large-scale mining projects and integration of Sierra Leone into the West Africa Power Pool, demand for energy in Sierra Leone continues to increase at a dramatic rate. To put the medium to long-term demand for energy in context, the market is divided into 3; (i) Urban Centre Demands; (ii) Emerging Industrial Demand; (iii) Export Markets

### Urban Centre Demand

The demand for electricity in the capital city and other urban centres around the country is presently conservatively estimated at 236 MW, compared with a total national

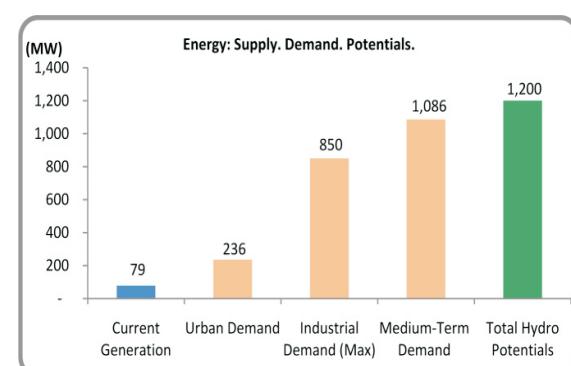
generation capacity of 78.5 MW. This demand is expected to increase as urbanization trends continue on an upward trajectory

### Industrial Demand

The conservative estimates of energy required by the 3 largest mining companies in the country range between 650MW and 850MW. The Government is encouraging these companies to move away from vertical integration in their production processes, to make room for separate private investments in the generation and distribution sub-sectors.

### Regional Export Markets

Sierra Leone's inclusion in the West Africa Power Pool (WAPP) network offers almost unlimited opportunities for the transmission and export of locally generated energy to other neighbouring countries, which are also experiencing huge power shortages.



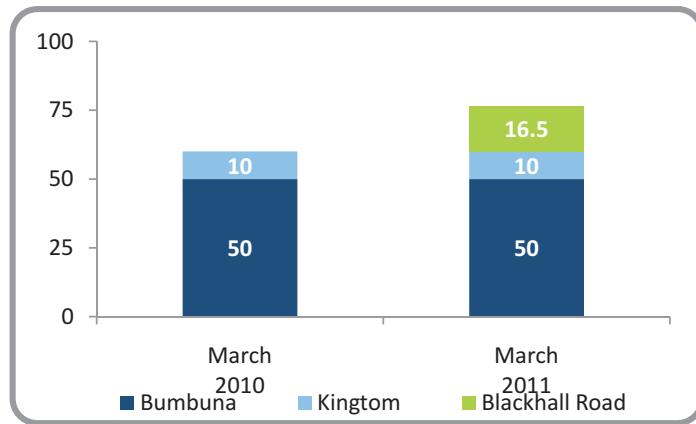
## RECENT DEVELOPMENTS IN GENERATION, TRANSMISSION AND DISTRIBUTION

In line with the Government's sector priority of increasing the nationwide supply of electricity, a number of notable developments have already been implemented, while others are ongoing. These are as follows.

### Bumbuna Hydro and Freetown Thermal

The completion of the Bumbuna Hydro Electric Power project led to an increase in the electricity supply in the country, with its estimated peak supply of about 50MW. A second thermal project in the east end of the capital city, increased this by a further 16.5 MW added to the 10 MW supply that was already in place at the King Tom Power Station.

Recent Additions to Energy Generation Levels (MW)



## Transmission and Distribution Infrastructure

A comprehensive T&D network rehabilitation project was launched in 2010, as part of a medium term investment programme that will see the complete overhaul and expansion of the country's entire domestic T&D network.

### Bumbuna Phase 2 Feasibility Studies

The Government of Sierra Leone signed a Memorandum of Understanding with a private investment group, Joule Africa, for execution of technical and commercial feasibility studies for Phase 2 of the Bumbuna Hydro electric project, which should enable a combined hydro energy generation of up to 372MW. This study is to be completed by Q4 of 2012.

### West Africa Power Pool Network

The inclusion of Sierra Leone in the WAPP Network creates opportunities for exporting excess energy generated to local regional markets

### Mini Hydro Projects

There are ongoing projects for mini-hydro projects in various locations around the country; 3MW at Charlotte just outside Freetown; 2MW at Banksokoa and 170 KW at Makali.

## Regulatory and Policy Framework

The regulatory and public policy framework of the energy sector aims at encouraging and supporting private investment into the Generation and Distribution of electricity both locally and for exports. This framework consists of the following key:

- Updated Legal and Regulatory Code by introducing new laws and regulations that enable the participation of Independent Power Producers (IPPs) in the power generation and distribution sub-sectors
- Improvement of tariff structures and billing and collection processes, reduce technical and financial inefficiencies
- Establishment of feed-in tariffs to harmonise the sale of power from various IPPs into the national grid or the WAPP
- Utilisation of international best practice in protection, safety and security of private investments in energy and power generation and sales
- Pursuit of regional cooperation and integration in matters relating to energy infrastructure investments and developments

## Unique Selling Points of the Energy Sector

### 1. Significant Hydro Power Generating Potentials

The total national hydro generating potentials in the country is estimated at about 640 MW

Ongoing investments in a major hydro power project of 372 MW leaves opportunities for investments in up to 268 MW, with

And estimated 200MW potentially from one source

The remaining through mini-hydro power dams with generating potentials of between 2 MW and 10 MW

### 2. Ready Local Demand

Total current and medium-term demand for electricity in the country is estimated at over 1,000MW; as a result of:

Ongoing industrial and manufacturing investments in the extraction of iron ore and processing of ore into steel potentially demand about 850MW in the medium term and expectations of increased demand thereafter

Demand for electricity in major urban cities and towns, currently estimated at around 240MW

This creates further opportunities for investments in other sources such as thermal and other renewable such as biomass and solar

### 3. Access to Regional Energy Export Market

Sierra Leone has ready access to export markets for energy in the West African market through the West African Power Pool, an energy market created through a regional infrastructure protocol of ECOWAS

Potential external demand in the immediate neighbouring countries of Liberia and Guinea is estimated at over 2,3500MW

### 4. An underinvested Transmission and Distribution Network

- With a current T&D capacity in Freetown of less than 20MW, there are opportunities for investing in the infrastructure to increase the capacity to over 100MW in Freetown as well as other parts of the country
- Favourable incentives in place for private sector participation in the development of the country's segment of the West Africa Power Pool network

### 5. An Improved PPP Framework

The country has developed clear and transparent procedures for private sector participation in the energy investments through PPPs

The institutional capacity institutional arrangements for issuance of IPP licenses, execution of PPP Agreements and general regulation of the energy sector are being enhanced and streamlined.

## OPPORTUNITIES FOR INVESTMENT

Sierra Leone's energy sector offers a number of investment opportunities in terms of direct Investments and public-private partnerships. The following are some unique opportunities:

### 1. Harnessing Untapped Hydro Potentials of up to 268 MW, for which there is a ready demand market locally

#### Bikongor Feasibility Studies and Development

Bikongor is one largest potential sources hydro power in Sierra Leone; with energy generation potentials of up to 200MW when fully exploited.



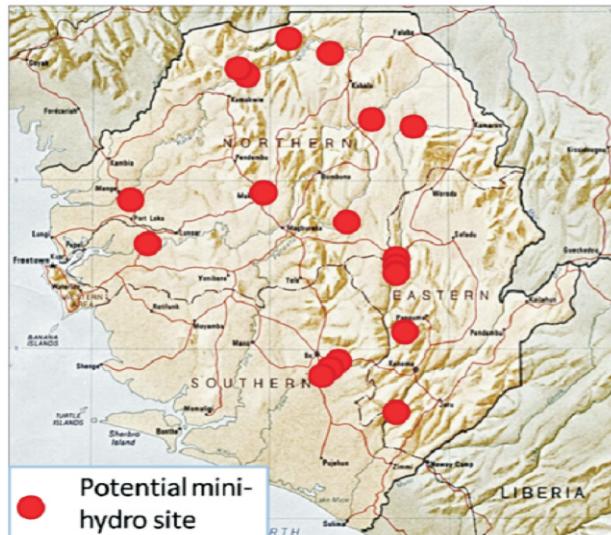
The Government of Sierra Leone, within the context of its PPP Framework, welcomes private sector interest in initially conducting technical feasibility studies on the potential generating capacity of the source.

This will be succeeded by the execution of a suitable PPP strategy for the development and operation of the asset.

## Mini-Hydros

In addition to the large hydro power potential sources in the country, Sierra Leone also has proven sources for hydro-power generation in various parts of the country.

Many of the sources have generating potentials of between 2 MW and 12 MW. The District headquarter-towns of Moyamba and Kono have mini hydro projects for which technical feasibility studies have been completed.



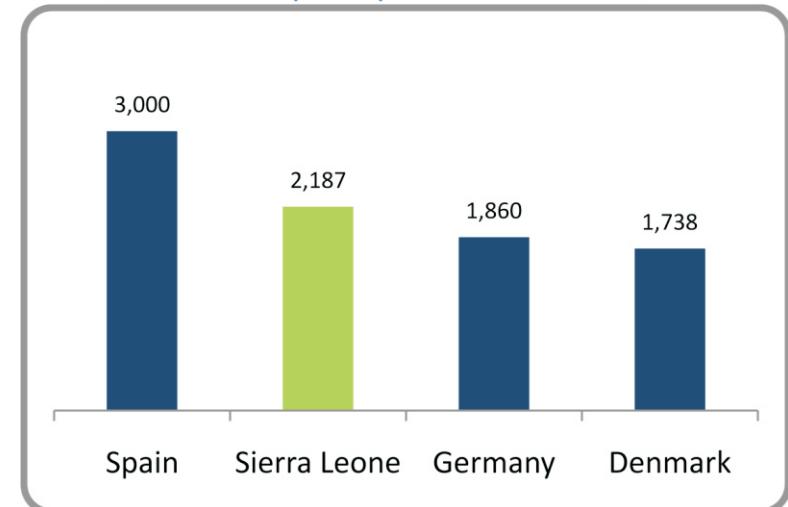
The Moyamba projected has received support from the United Nations Industrial Development Organisation and (UNIDO) and the results of the study, including investment cost estimates are available.

The Government is willing to engage in PPP discussions with credible private sector organisations.

## 2. Other renewable energy potentials, for which there is also a ready demand market locally



Sierra Leone vs Top 3 Europe Solar Power Producers



## Biomass Energy

Agricultural biomass waste is expected to be significantly high over the next 3 to 5 years as a result of ongoing and new large scale agriculture projects in oil palm – over 150,000Ha; sugarcane over 250,000Ha; and rice – over 600,00Ha.

The waste collected from these farms can serve as major inputs in the generation of biomass energy.

The dramatic increase in municipal waste from major cities and other urban areas, particularly Freetown, also offer ready input markets for energy generating projects

Current agricultural biomass and municipal waste is estimated at 656,000 MT per year, with a total annual energy potential of 2,700 GWH or 308 MW.



## 3. Complementary thermal energy opportunities, for local industrial demand and export

### Thermal Energy

- As more industrial operations in the iron ore, steel and agro-processing sectors come on stream, there is need for complementary thermal power generation
- Medium-term estimates for thermal power from coal and other fossil fuels are projected at about 500MW to meet industrial needs.



### Bio-Fuels

The production of bio-diesel and ethanol from palm oil and sugar cane are investments that the Government offers additional incentives over and above general scope of incentives in the country.

- The production of bio-diesel may be integrated with state-owned oil palm plantations at Gambia and Mattru in the Bonthe District, which are available for private sector participation.

#### 4. Investments in National and Regional Transmission and Distribution Network Infrastructure

##### Domestic Infrastructure

- There are opportunities for investing and operating a T&D network, as an unbundled component in energy generation and distribution
- A national network of over 600Km of high tension cables



##### WAPP

- With the blueprint for the Sierra Leone segment of the WAPP already developed, there are opportunities for investing in this network as a means of distributing energy domestically as well as for exports to regional markets.

