



Ministry of Foreign Affairs

Sector Scan

The Energy Sector in Liberia

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Sector Scan

The Energy Sector in Liberia

March 2018

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Liberia Netherlands Business and Culture Council (LNBCC)



Liberia Netherlands Business and Culture Council

The Liberia Netherlands Business and Culture Council (LNBCC) is an organization that represents the business interests of both Liberian and Dutch companies. The LNBCC has been active in the capital - Monrovia - since 2016, and is an extension of the Ghana Netherlands Business and Culture Council (GNBCC). Both organizations work closely together with the Embassy of the Kingdom of the Netherlands in Ghana.

The LNBCC's core business is the promotion and fostering of trade relations between Liberia and the Netherlands, under the mantra of 'growing together'. Currently two employees - Theo Dennis and Eline Terneusen - are working together in developing a membership base, producing sector scans on subsections of the economy and organizing networking events.

Besides those core activities, the LNBCC offers services to both members and non-members in the following areas:

- Business development services: the LNBCC executes market studies for businesses wanting to extend their services to Liberia. Company profiling and company visits can be set with possible local partners. The LNBCC can also represent organizations locally. With researchers on board with extensive experience in qualitative research methods, the LNBCC can provide local and context specific information on a wide variety of topics.
- Business support services: The LNBCC provides advice on financial constructions, accounting, bookkeeping, registering processes in Liberia, manners to get subsidies for business models and trainings for accountants.
- Travel support services: LNBCC can negotiate prices for / provide car rentals, hotel bookings, visa and immigration requirements.
- Trade mission & event services: Through our network we bring together authorities, experts and entrepreneurs. The LNBCC organizes events such as plenary sessions, workshops, trainings and meet & greets by taking on the event planning and management.

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Chapter 1 | EXECUTIVE SUMMARY

The lack of energy infrastructure development since the end of the civil has been identified by the Liberian government as a key limiting factor to the nation’s economic growth. The expansion of this infrastructure has become a priority within the region, supported by the West African Power Pool (WAPP) and its 2000 Master Plan. Liberia, as a nation, has stipulated in its National Energy Policy that by 2030 they aim to provide access to energy to 70% of the population of Monrovia and 35% of the population as a whole. The recent rehabilitation of the Mount Coffee Hydro plant is a first clear step in the realization of these plans.

The strategic objective of the Liberian government is to extend the grid throughout Monrovia and other urbanized areas. As the rural areas are sparsely populated, power can most easily be provided in those areas using small-scale thermal-, solar- and hydro-technologies. The need for more widespread and dependable energy provision means there are several business opportunities in the sector that are of immediate and high demand (immediate opportunities), whereas other solutions are very much viable but can be developed over the longer term (long-term opportunities).

Immediate Opportunities	
Grid Extension	<ul style="list-style-type: none"> - Within Monrovia - To larger rural areas - MV distribution lines - Local LV distribution systems - Transformers
Solar Power	<ul style="list-style-type: none"> - Particularly between February-March - Solution for hard-to-reach rural areas - Accompanied by storage systems
Hydropower	<ul style="list-style-type: none"> - Cavalla river, St.John river, St.Paul river - Storage facilities upstream to secure flow during dry season
Batteries	<ul style="list-style-type: none"> - To support LEC - To accompany hydro plants - To accompany solar solutions - To provide power in rural areas - To sustain power in urban areas: will lead to more commercial clients
Long Term Opportunities	
Wind	<ul style="list-style-type: none"> - Coast: rainy season high wind speeds - Rural interior: lower windspeed but constant throughout the year
Waste to Energy	<ul style="list-style-type: none"> - Municipal Solid Waste - Waste solution of high need - Monetize waste to incentivize citizens

The scan then touches on key challenges facing the sector such as limited infrastructure and illegal tapping. Finally, the policy and institutional framework are discussed.

Chapter 2 | ACRONYMS

AfDB	African Development Bank
AfT	Agenda for Transformation
AU	African Union
CLSG	Cote D'Ivoire, Liberia, Sierra Leone, Guinea
ECOWAS	Economic Community of West African States
EIB	European Investment Bank
EVD	Ebola Virus Disease
GDP	Gross Domestic Product
HFO	Heavy Fuel Oil
JICA	Japan International Cooperation Agency
KfW	Kreditanstalt für Wiederaufbau
LEC	Liberia Electricity Corporation
LNIC	Liberia National Investment Commission
MLME	Ministry of Lands, Mines and Energy
MRU	Mano River Union
MSW	Municipal Solid Waste
MWh	Megawatt/hour
NEC	National Energy Committee
NEP	National Energy Policy
NESF	National Energy Stakeholders Forum
PPA	Power Purchase Agreement
REFUND	Rural Energy Fund
RESMP	Rural Energy Strategy and Master Plan
RREA	Rural and Renewable Energy Agency
TRANSCO CLSG	Transmission Company Cote D'Ivoire, Liberia, Sierra Leone and Guinea
TSA	Transmission Service Agreement
WAPP	West African Power Pool

Chapter 3 | THE LIBERIAN CONTEXT

Liberia - Africa's oldest republic - is scenic, diverse and naturally resource rich. This entails the potential for significant natural resource exports, including large iron ore deposits and the potential for oil production. The country is tribally diverse, with 16 languages spoken across 15 counties. Liberia was declared a nation in 1847 by freed and freeborn black Americans who had arrived at its shores 26 years earlier. Between the 50s and 70s Liberia was a pillar of strength as many African nations were moving away from colonialism and in 1959 hosted the inception meeting of what is now called the African Union (AU). With strong ties to the United States, the biggest rubber plantation in the world, and an abundance of minerals, Liberia was wealthy and stable for decades. Between 1989 and 2003 civil conflict flared up twice in the nation, causing massive displacement and economic degradation.

Since peace ensued in Liberia in 2003, the Liberian economy has again been viewed with optimism as aid-driven recovery and growth started shifting into private sector driven growth. In 2005, Liberia had \$82 million in Foreign Direct Investments, and by 2013 this figure had risen significantly to \$700m, peaking in 2011 to \$1.3 billion. Most of these investments were from mining, oil palm and forestry, where \$16 billion worth of agreements were signed. Harnessing this private sector potential has become a priority for the Liberian government, who are aiming to narrow the gap of growth and revenue between large (foreign) corporations and small local businesses.

The 2014 outbreak of the Ebola Virus Disease (EVD) slowed down the economic recovery significantly. The World Bank estimated a decrease of 11.7% of the country's GDP in 2014. Research showed 10% of businesses closed in relation to the crisis and overall employment decreased by 33%. However, the same research also showed businesses' optimism that employment and revenues would increase within the next 6 months.

EVD posed the most daunting threat to the momentum Liberia's economic growth since the civil wars. However, the growth of the marketplace in both diversity and capability in the preceding ten years provides a solid ground for the economy to - with the right support - bounce back. Liberia's current Agenda for Transformation (AfT) strategy holds as priority broad-based economic growth and employment creation. The agenda identifies electricity as a major constraint to doing business in the country¹. The costs of manufacturing and processing projects have since the civil war been economically infeasible due to high electricity costs. The need for growth and reform within the sector are high and will be necessary to allow the Liberian economy to flourish to its full potential. In recent years big projects have been undertaken by the government to increase the generation of sustainable and environmentally friendly power. Also, the AfT has identified that investments in power have projected economic rates of return of 15-30 percent per annum. Regional infrastructure projects are increasing in importance with the potential to import power through the West African Power Pool (WAPP), and develop regional transportation corridors in the Mano River Union (MRU).

¹ World Bank 'Doing Business 2012 Survey'.

Chapter 4 | COUNTRY OVERVIEW

Bordering countries:	Sierra Leone, Guinea, Cote d'Ivoire
Land size:	111,369 km
Population:	4.4 million
Literacy rate:	42.9%
Life expectancy	60.2
Poverty rate:	96.9%
Urban population:	48%
GINI Index	38.2
GDP	2.10 billion US Dollars
GDP growth 2016	2.5%
Inflation rate	11.50%
Unemployment rate	3.80%
National budget	526.6 million US Dollars
Aid per Capita	149.80 US Dollars
Road Network	6.2%
Access to Electricity	2%
Mobile penetration	75%
Internet penetration	21%
Trade and Economic Memberships	ECOWAS Mano River Union African Growth and Opportunity Act (AGOA) EU - Everything but Arms (EBA) China Preferential Trade Agreement with Developing Countries Multilateral Guarantee Agency (MIGA) New Partnership for Africa's Development (NEPAD)
Residential customers at the Liberia Electricity Corporation	6,200 accounts in 2012 ²
LEC Tariffs	\$0.39 per kilowatt hour

²Liberia Electricity Corporation. Electric Master Plan. March 2011 (pg. 17)

Chapter 5 | THE ENERGY SECTOR

In the early 1950's there was a growing need for power in Liberia in order to support its growing economy. Being rich in hydrological resources, the Nation looked to its rivers. In 1964, construction of the Mount Coffee hydroplant started. Its initial capacity was 30 MWh. An additional 34MWh was installed by 1973. For over 25 years Monrovia and neighboring counties depended on the power generated at the Mount Coffee plant. When the civil war broke out in 1990, rebel forces seized the plant and forced employees to leave. As the conflict dragged on, the dam to spilled over and eroded most of the structure. The powerhouse and the transmission and distribution lines were ransacked.

For years there was no government provided energy in the country and only persons with diesel generators could enjoy power. When Ellen Johnson Sirleaf was elected president in 2006 she made the resurrection of the energy sector a top priority. In 2007 the Liberia Electricity Corporation (LEC) was revived with an emergency power plan which diesel generated 2 MWh. At that point LEC had some 450 customers. By 2011 Madam Sirleaf was able to garner the support of Norway, Germany and the European Investment Bank to fund the rehabilitation of the Mount Coffee plant. The Millennium Challenge Corporation joined in 2015 as a project funder³.

The functioning of LEC was restored and power extended to some 2500 persons within Monrovia in 2010. Still, access to publicly provided power was close to 0% nationwide in 2011, with access reaching only to 0.58% for the urbanized Monrovia population. By 2016, the access rate has improved to 2% nationwide and 6.7% in Monrovia⁴. The goals set out by the National Energy Policy (NEP) aim to connect 70% of the Monrovia population and 35% of the nation as a whole by 2030.

New transnational endeavors are changing the energy sector in West Africa. In 1999, the West African Power Pool (WAPP) was created and in 2000 its Master Plan was put in place to provide energy throughout West Africa at an affordable price⁵. The Master Plan aimed to accelerate several regional interconnection line projects, one of which was a line to connect Cote D'Ivoire, Liberia, Sierra Leone and Guinea (CLSG). The CLSG project is a multinational investment operation and is financed by the World Bank, The European Investment Commission (EIB), the KfW and the African Development Bank (AfDB). This led to a Treaty being signed by the CLSG Head of State to establish a special purpose company called the Transmission Company Cote D'Ivoire, Liberia, Sierra Leone and Guinea (or TRANSCO CLSG). Getting connected to this transmission line is expected to have an extremely positive impact on the reliability and affordability of power in Liberia.

³ Mount Coffee Project Implementation Unit. "Mt. Coffee Hydropower Plant Rehabilitation: Project Implementation Unit (PIU)". Retrieved from: <http://mtcoffeeliberia.com/>

⁴ Options for the Development of Liberia's Energy Sector, World Bank 2011. Available at http://siteresources.worldbank.org/EXTAFRREGTO-PEnergy/Resources/717305-1266613906108/Liberia_Energy_ESW_11-4-11web.pdf

⁵ TRANSCO CLSG 'Overview'. Retrieved from: <http://www.transcocslg.org/overview/>

Important steps that have been taken to improve the access to electricity in Liberia include⁶:

- The rehabilitation of the Mount Coffee hydropower plant.
- The engagement of the private sector for the provision of renewable small scale and utility scale electricity generation plants.
- Investments for associated transmission and distribution.

The Ministry of Lands, Mines, and Energy (MLME) is currently implementing an Electricity Master Plan (EMP) to develop the energy sector.

Key EMP objectives to be reached before 2030 include⁷:

- Reconstruction and expansion of the transmission and distribution infrastructure
- Expansion of firm generation capacity
- Diversification of generation sources
- Reduction in the cost of electricity
- Increasing the reliability of electricity supply
- Development of the effective management of the sector
- New legal and regulatory frameworks
- Attracting private investment to the energy sector, particularly in generation, transmission and distribution facilities.

The George Weah and his Coalition for Democratic Change (CDC) - who was sworn into government on January 22nd 2018 - acknowledges the access to electricity as a vital development driver. He places its development within the broader context of infrastructure rehabilitation, also noting that public investment in public utilities is critical for stimulating private investment⁸.

Due to long bureaucratic processes, it currently takes an average of 465 days and costs 4066.6 percent of income per capita to get electricity. There is enormous room for growth and improvement, which when achieved will lead to development in many other sectors of the economy, as power supply becomes cheaper and more reliable⁹. The government sees a key role for large mining enterprises who will be major customers, sources of finance as well as possibly implementers of power supply for themselves and communities near the mines¹⁰.

⁶ IMANI 'Report: An Analysis of Key Political Premises Ahead of Presidential Elections in Liberia'. Retrieved from: <http://www.imaniafrica.org/wp-content/uploads/2017/10/IMANI-REPORT-AN-ANALYSIS-OF-KEY-PROMISES-AHEAD-OF-PRESIDENTIAL-ELECTIONS-IN-LIBERIA.pdf>

⁷ Liberia National Investment Commission. 'Investment Opportunities in Energy'. Retrieved from: http://investliberia.gov.lr/new/page_info2.php?&7d5f44532cbfc489b8db9e12e44eb820=NDU%3D

⁸ <http://uppliberia.org/upp-news-desk>

⁹ FPA 'President-elect George Weah to Inherit a Broke Government' (8th January 2018). Retrieved from: <https://www.frontpageafricaonline.com/index.php/politics/6558-president-elect-george-weah-to-inherit-a-broke-government>

¹⁰ Republic of Liberia (2013). 'Agenda For Transformation: Steps Toward Liberia RISING 2030'. Retrieved from: https://governancecommissionlr.org/doc_download/AfT%20document-%20April%2015.%202013.pdf?a4705305cd27e04fb1f66830e7e0ef9d=NzE%3D

Chapter 6 | OPPORTUNITIES

Immediate Opportunities

Grid extension

Due to expected population- and economic growth in the coming 30 years, demand is expected to stand at 100% in the urban and 70% in the rural areas. Providing power to these areas will most cost effectively be achieved by grid extension throughout Monrovia and larger settlements in the rural areas to 90-95% of the targeted population (some 800,000 households)¹¹. The remaining 5-10%, who live in sparsely populated and hard to reach areas, will be most cost-effectively served by stand-alone diesel or solar systems.

An estimates US\$1 billion will be required for grid construction, 9,900 km of MV distribution line, local LV distribution systems, transformers and all household connection costs. This would lead to meeting a total aggregate national demand of some 500 MW, 79% (395 MW) of which is targeted for Monrovia itself. Most of the customers currently connected to the grid are residential. Including commercial corporations into the customer base would increase the demand drastically.

Solar Power

Liberia is located near to the equator, creating conditions that are favorable for the use of solar radiation for the generation of energy. Both hydro and solar power have great potential, but since the weather alters so drastically between the dry and rainy seasons, the two sources of energy have their peaks at different times of the year.

Satellite measurements point to a monthly average daily solar radiation between 6.02kWh/m²/d in the months of February to March, and 3.85 kWh/m²/d between the months of July and August¹². This means great prospects for photovoltaic systems, especially in the dry season. The Liberia National Investment Commission (LNIC) sees a peak total production of 1400-1700 kWh (including losses) as a realistic, untapped potential.

Rural areas of Liberia are generally not connected to the grid at all. Solar power generation is a great option for hard-to-reach areas where connecting to a local power station is not an option either. Solar power generation options are most viable in combination with storage systems, as peak use of electricity does not coincide with daylight. Through storage systems the dip in power generation throughout the rainy season can also be mitigated¹³.

Hydropower

Liberia holds vast untapped hydropower potential. With its average rainfall of 4624 mm per year in the capital, it is the most rained upon capital city on earth. The vast majority of this rain falls between the months of May and June, peaking in the months of August and September. On average 385.3 mm of rain falls on a monthly basis, and on average there are 182 days per year with more than 0.1 mm of rain¹⁴.

Currently, the Mount Coffee Hydroplant is the only generator of hydropower in the country. Since completion of the dam, the construction of storage facilities upstream have come underway. These storage facilities are meant to sustain the

¹¹ Modi, V. et al. (2013) 'Liberia Power Sector Capacity Building and Energy master Planning Final Report, Phase 4: National Electrification Master Plan.' *Department of Mechanical Engineering (SEAS) and Earth Institute*.

¹² LNIC 'Solar Power Potential'. Retrieved from: http://investliberia.gov.lr/new/page_info2.php?&7d5f44532cbfc489b8db9e12e44eb820=NDU%3D

¹³ Liberia National Investment Commission.

¹⁴ ClimaTemps 'Rainfall in Monrovia'. Retrieved from: www.liberia.climatemps.com/precipitation.php

generation of energy by the dam throughout the dry season. Constructing hydro plants is capital intensive, but once they are in place they are cheap and easily maintainable.

According to the Liberia National Investment Commission, the potential hydropower capacity in Liberia reaches up to 1,500MW¹⁵. Close consideration of the following elements are necessary when thinking of working in hydropower in Liberia: the suitability of hydropower plants with and without reservoirs, verification of technical and hydraulic data, integration into the transmission grid and environmental and social impacts. Some of the country's biggest rivers are border rivers and therefore demand a regional approach. The Agenda for Transformation identified the Cavalla River, the St. John River and the St. Paul River as potential sites for hydroelectricity projects¹⁶.

River Basin	Design Flow (m ³ /sec)	Head (m)	Capacity (MW)
Mano	2.43 - 9.47	12.00 - 30.00	10-Jul
Lofa	3.25 - 55.70	6.00 - 55.00	0.19 - 7.51
Farmington	16.9	15	2.01
St. John	2.32 - 60.40	12.00 - 33.00	0.62 - 15.81
Timbo	6.51	12	0.619
Cestos	6.51 - 8.30	10.00 - 15.00	0.79 - 1.00
Sehnikweh	3.47 - 5.78	12.00 - 20.00	0.33 - 0.550
Buto	0.26	20	0.044
Cavalla	0.66	25	0.13

The country also offers several sites which hold small hydro power potential¹⁷:

Batteries

The instability of the power production at Mt. Coffee hydroplant and the Bushrod island thermal plant create an immediate business opportunity for the installation of batteries. Introducing batteries into the system will improve the reliability of the power supply, which will increase the customer base and possibly attract more corporations as customers to LEC. The installation of batteries also makes the installation of solar panels a more profitable and sustainable endeavor as its will allow for power to be used during peak usage hours such as the nighttime. It will also allow for the storage for a reserve of energy for the rainy season, during which time less solar power can be generated.

Long Term Opportunities

Wind

Based on wind speed data which was made available globally, the estimated speed of the wind in Liberia's coastal areas is approximately 3.5/s to 6 m/s, depending on the month of the year¹⁸. Windmills have the potential to be used throughout the country, especially turbines specialized for low wind speeds. Higher wind speeds in the coastal areas provide a good

¹⁵ LNIC 'Hydro Power Potential'. Retrieved from: http://investliberia.gov.lr/new/page_info2.php?&7d5f44532cbfc489b8db9e12e44eb820=NDU%3D

¹⁶ Agenda For Transformation (2013). Retrieved from: https://governancecommissionlr.org/doc_download/AfT%20document-%20April%2015,%202013.pdf?a4705305cd27e04fb1f66830e7e0ef9d=NzE%3D

¹⁷ LNIC 'Small Hydropower Potential'. Retrieved from: http://investliberia.gov.lr/new/page_info2.php?&7d5f44532cbfc489b8db9e12e44eb820=NDU%3D

¹⁸ LNIC 'Wind Potential'. Retrieved from: http://investliberia.gov.lr/new/page_info2.php?&7d5f44532cbfc489b8db9e12e44eb820=NDU%3D

source of energy in specific months, while the constant wind speed in the more mountainous, rural areas are more reliable throughout the year.

Waste to Energy

Municipal Solid Waste (MSW) is an untapped source of energy generation in Liberia. According to a 2012 study, waste generation in Liberia lay at 164 kg/capita in 2012, with estimated projections for dramatic increases over the coming 13 years¹⁹:

Waste generation 2012 (kg/capita)	164
Estimated waste generation 2025 (kg/capita)	256
Waste generation (10 ³ t/year)	339
Estimated waste generation 2025 (10 ³ t/year)	814
Waste collection (10 ³ t/year)	135
Estimated waste collection 2025 (10 ³ t/year)	489

The dense population of the capital city of Monrovia has created a municipal waste disposal crisis. Organizations such as the Gates Foundation, UNICEF and the World Bank²⁰ have attempted to tackle this issue. Converting the waste into energy may turn it from a burden into a renewable energy solution. Turning waste into a commodity will provide an incentive for citizens to properly dispose of their waste.

Thermal Energy

38 MW are now being generated at Bushrod Island through a thermal power plant. This thermal plant has been funded by the World Bank and Japan's International Cooperation Agency (JICA). This because it is a different system than used at Mt.Coffee, they do not communicate with one another. During the dry season when the water levels are too low for Mt.Coffee to generate power, the Bushrod power generation has to come in.

¹⁹ Scarlat, et al. (2012). 'Evaluation of Energy Potential of Municipal Solid Waste From African Urban Areas'. *Renewable and Sustainable Energy Reviews*. Retrieved from: https://ac.els-cdn.com/S1364032115005389/1-s2.0-S1364032115005389-main.pdf?_tid=1c88d43a-fba3-11e7-ad99-00000aab0f6b&acdnat=1516206543_c20244f82b8e87aed33f0657997790e7

²⁰ Generosity 'Paynesville, Liberia Waste-to-Energy Project.' Retrieved from: <https://www.generosity.com/community-fundraising/paynesville-liberia-waste-to-energy-project>

Chapter 7 | FINANCIAL SUPPORT

Dutch companies coming into the Liberian energy sector can benefit from several financing opportunities. The first cluster consist of financing coming from the Netherlands. More specifically RVO. There are also several international agencies rolling out multi-year donor supported programs to which Dutch companies could link.

DHI

DHI is a subsidy scheme for demonstration projects, feasibility studies and investment preparation studies. It supports Dutch enterprises who want to invest or execute a project in emerging markets in developing countries. It provides a great opportunity for companies to test their energy product or service in a new market. The scheme works using a tender programme, which takes applicants twice per year. The second tender in 2018 opens from 9 August to 21 September.

Learn more: <https://english.rvo.nl/subsidies-programmes/dhi>

Dutch Good Growth Fund

DGGF provides financial assistance to Dutch companies wanting to do business in emerging markets. Through this instrument they provide development related trade and investment in over 60 countries. It is specifically tailored towards SME's and provides customized financing schemes. DGGF offers guarantees and direct financing with a repayment obligation, such as loans and equity investments in projects. For Dutch companies looking to export capital goods to one or more of the DGGF countries, the DGGF facility 'Exporting Dutch SMEs' provides export credit insurance and export financing.

Learn more: <https://english.rvo.nl/subsidies-programmes/dutch-good-growth-fund-dggf>

USAID's Power Africa Program

This USAID program was launched in 2013 and aims to bring safe and renewable energy sources to 26 subsaharan African countries. Power Africa's engagement in Liberia is rooted in an agreement between the Millennium Challenge Corporation (MCC) and the Government of Liberia (GoL), which was signed in 2015. The US\$257 million power and roads sector compact includes funding for the rehabilitation of the Mt.Coffee Hydroelectric Plant, development of a training center for technicians in the electricity sector, support for the creation of an independent energy sector regulator, and support for the development of a nationwide road maintenance framework.

Learn more: <https://www.usaid.gov/powerafrica/liberia>

World Bank

The World Bank is the biggest financial supporter of the West African Power Pool project (WAPP), intended to increase the flow of electricity access to rural communities bordering Liberia, Guinea, Sierra Leone and Ivory Coast. They are also currently implementing the 'Liberia Renewable Energy Access Project' (LIRENAP). This US\$27 million project holds as its objective to increase access to electricity and to foster the use of renewable energy resources. The project incorporates technical assistance with hydropower, solar power and thermal power solutions. The project will run from January 11 2016 to June 30th 2021.

Learn more: <http://projects.worldbank.org/P149683?lang=en>

European Commission

The European Commission is rolling out the Liberia Energy Access Project (LEAP 1), which addresses three major constraints in the sector: low access in Monrovia and River Gee counties, non-existence of electricity supply in rural areas and the limited human and technical capacity of the sector. The EU-AITF SE4ALL investment grant will finance the construction of the distribution networks in River Gee county and transmission/distribution lines and/ or substations in and around Monrovia.

Learn more: https://ec.europa.eu/europeaid/node/78782_fr

The European Commission is also enacting the Monrovia Consolidation of Electricity Transmission and Distribution, a 55 million Europa programme financed but he European Development Fund. The implementation area is the Greater Monrovia area, where the Liberia National Indicative Programme (NIP) will run from 2014-2020.

Learn more: https://ec.europa.eu/europeaid/sites/devco/files/ad3-annex-2-liberia-aap-2015_en.pdf

Energy Sector Management Assistance Program

ESMAP is a partnership between the World Bank Group and 18 partners to help low and middle-income countries reduce poverty and boost economic growth through environmentally sustainable energy solutions.

Learn more: <https://www.esmap.org/node/57270>

Chapter 8 | MARKET PLAYERS

The biggest player in Liberia's energy sector is the Liberia Electricity Corporation (LEC), which is a public utility entity. Its mandate is to produce and supply economic and reliable electric power to the entire nation. They are responsible for the entire grid which currently exists in the country and lead the Mt.Coffee Hydroplant Rehabilitation Project.

- Companies involved in the Mt.Coffee Hydroplant Rehabilitation:
 - MANITOBA HYDRO INTERNATIONAL (MHI): Project Implementation Unit (PMI)
 - NORPLAN FICHTNER: Engineer
 - VOITH: Hydroelectric Generating Equipment
 - DAWNUS: Civil Works
 - ANDRITZ: Hydraulic steelworks and auxiliary systems
 - NCC: Substations
 - ELTEL: Transmission lines
 - PSM: Camp construction and services
 - HYDRO OPERATION INTERNATIONAL: Operation, maintenance and training
 - TEICHMANN: Emergency Spillway

- TRANSCO CLSG: The regional electricity transmission company implementing the West African Power Pool (WAPP).
- SMEC: Operated in Liberia since 2016 entering the market as the Supervision for the Electrification of Economic Corridor Paynesville-Kakata and Greater Monrovia - Liberia (transmission and distribution networks) for LEC.
- AIMS Power: Retailer in Liberia of power inverters and solar power solutions.
- WESTCOAST ENERGY LIBERIA: A Liberian owned renewable energy company established in 2015. Involved in the sale and distribution of solar power
- ECOPOWER LIBERIA: Solar home systems
- Solar panel companies serving Liberia include: SHENZHEN GLOBAL, XIAMEN SOLAR, REC GROUP, LI-ANYUNGANG KAIYUAN TECHNOLOGY, SUNPOWER CORPORATION, SHANGHAI JUNLONG SOLAR, STION, FRONTIER RENEWABLES, MYTRADER LTD, etc.
See full list: <https://www.environmental-expert.com/companies/serving-liberia/?keyword=solar+panels>
- Diesel generator companies serving Liberia include: IDEA GENERATOR, INDOTECH INDUSTRIAL SOLUTIONS, GENPOWER GEENRATOR, FG WILSON, GENMAC, MORRIS SITE MACHINERY, JS POWER LIMITED, etc.
See full list: <https://www.energy-xprt.com/companies/keyword-diesel-generator-76752/serving-liberia>

Chapter 9 | KEY CHALLENGES

Expansion of the electricity sector has been hampered by several key challenges, which include the securing of adequate and affordable fuel (for thermal generation) and inadequate infrastructure for generation (thermal and hydro power), transmission and distribution²¹. Prices of Heavy Fuel Oil (HFO), on which LEC relied primarily for the generation of energy up to 2016, remain above regional averages. This is sustained as suppliers mark up prices to consolidate a perceived risk of civil instability, a lack of international safety standards at the port and the poor condition of the receiving terminal²². Repair projects have been initiated by the World Bank since 2010.

The Agenda for Transformation²³ identified the high capital cost of investment as a constraint. A lack of knowledge about alternatives was identified as the constraint to the introduction of renewable energy services. Additionally, a poor coordination between government agencies, international donors and international investors further constrained the development of renewable and affordable power across the country.

Another key challenge identified by private sector entities working in the energy sector is that of illegal tapping. Large amounts of energy are being tapped illegally off the grid. Many of the persons illegally tapping feel justified in doing so as they have actually put in a request for energy and paid the necessary fees, but LEC is taking months to respond.

Fraud and corruption are big stumble blocks for the energy sector. The new government will have to crack down and show zero tolerance towards corruption in order to root out the culture of corruption that has permeated this sector.

²¹ Options for the Development of Liberia's Energy Sector, World Bank 2011. Available at http://siteresources.worldbank.org/EXTAFRREGTOPENERGY/Resources/717305-1266613906108/Liberia_Energy_ESW_11-4-11web.pdf

²² Options for the Development of Liberia's Energy Sector, World Bank 2011. Available at http://siteresources.worldbank.org/EXTAFRREGTOPENERGY/Resources/717305-1266613906108/Liberia_Energy_ESW_11-4-11web.pdf

²³ Republic of Liberia (2013). 'Agenda For Transformation: Steps Toward Liberia RISING 2030'. Retrieved from: https://governancecommissionlr.org/doc_download/AfT%20document-%20April%2015.%202013.pdf?a4705305cd27e04fb1f66830e7e0ef9d=NzE%3D

Chapter 10 | POLICY FRAMEWORK

Agenda For Transformation (AfT)

The Agenda for Transformation as published on April 15th 2013, is the Government of Liberia's five-year development strategy. It sets up Liberia's long term vision of socio-economic transformation and development and articulates precise goals and objectives with corresponding interventions to move Liberia closed toward structural economic transformation. The 'Power and Energy' subsection (p.70) lays out the goals, constraints, objectives and agents for change identified for the energy sector.

Read full document here: https://governancecommissionlr.org/doc_download/AfT%20document-%20April%2015,%202013.pdf?a4705305cd27e04fb1f66830e7e0ef9d=NzE%3D

National Energy Policy (NEP)

The 'National Energy Policy: An Agenda for Action and Economic and Social Development' was developed by the Ministry of Lands, Mines and Energy and endorsed in 2009. It is the product of an extensive process of consultations that started with the National Energy Stakeholders Forum (NESF) in October of 2006. Recommendations from that forum were summarized, scrutinized and validated by all involved stakeholders, resulting in the NEP.

Read full document here: <http://www.moci.gov.lr/doc/National%20Energy%20Policy%202009.pdf>

New Energy Act 2015

Also called the '2015 Electricity Law of Liberia', established the legal and regulatory framework for the generation, transmission, distribution and sale of electricity within Liberia. It also covers the import and export of power. The purpose of the law is the facilitate the implementation of the National Energy Policy.

Read full document here: https://www.rrealiberia.org/forest/doc_download/2015%20Electricity%20Law%20of%20Liberia.pdf

Rural Energy Strategy and Master Plan for Liberia Until 2030

Made public in April 2016, the document presents Liberia's Rural Energy Strategy and Master Plan (RESMP) sets clear targets, identifies least-cost projects and technologies and proposes concrete investments for funding and implementation with appropriate institutional framework and capacity.

Read full document here: <http://liberiaruralenergy.org/sites/default/files/A%20-%20Rural%20Energy%20Strategy%20and%20Master%20Plan/LR.2016.R.002.2%20Rural%20Energy%20Strategy%20and%20Master%20Plan.pdf>

Chapter 11 | INSTITUTIONAL FRAMEWORK

Liberia Electricity Corporation (LEC)

LEC is a public utility created in 1973 by the Government of the Republic of Liberia. It is the sole provider of energy within the national grid.

Ministry of Lands, Mines and Energy (MLME)

The ministry has activated the National Energy Committee (NEC) as an inter-agency advisory body on energy matters comprising of nine members including government ministries and public corporations. This is in agreement with the multi-sectoral approach being encouraged by the Economic Community of West African States (ECOWAS)

Rural and Renewable Energy Agency (RREA)

In January 2010, President Ellen Johnson Sirleaf issued Executive Order No.23 establishing Liberia's Rural and Renewable Energy Agency (RREA), and a Rural Energy Fund (REFUND), to bring modern energy services to Liberia's rural areas. In July 2015 an act was finally passed to establish the RREA.

West African Power Pool (WAPP)

West African Power Pool (WAPP) was created by ECOWAS in 1999 and in 2000 its Master Plan was put in place to provide energy throughout West Africa at an affordable price. As part of the WAPP 2014, a cross-border extension project will draw lines between Cote-D'Ivoire, Sierra Leone, Liberia and Guinea.

CLSG Technical Committee

The CLSG technical committee work together with the management of TRANSCO CLSG, the entity responsible for the construction of the multi national transmission lines. They developed and signed both the Transmission Service Agreement (TSA) as well as the Power Purchase Agreement (PPA).

Liberia Electricity Regulatory Commission (LERC)

LERC is the newly created regulatory agency in charge of licensing activities, issuing regulations to implement the electricity law, approving tariff setting methodologies and to establish, monitor and enforce technical, performance and security regulations and standards.



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