

**ENERGY
CATALYST**

Country Guide: Liberia

June 2020



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Liberia is a country in West Africa and the oldest on the continent. Located on the West African Coast, it borders Sierra Leone, Ivory Coast and Guinea. The landscape is characterised by flat to rolling coastal plains that contain mangroves and swamps, which rise to a rolling plateau and low mountains. Liberia's climate is equatorial, with a rainy season between May and October and windy the remainder of the year.

Table 1: Liberia at a glance

Capital	Monrovia
Total Area	111,369 km ²
Population	4,418,977
Official languages	English; Liberian English
Rural Population	49% (2018)
GDP	US \$ 3,217 Billion
GDP Per Capita	US \$703
Currency	Liberian Dollar (LRD)
Exchange rate 01/03/2020	1 GBP = 252.57 LRD
Exchange rate 01/03/2018	1 GBP = 179.71 LRD
Access to Electricity	19% (2019)
Urban electricity access	16%
Rural electricity access	3%



Figure 1: Map of Liberia. Source: onestopmap

Liberia held its third post-war general election in 2017 which saw George Weah, a former soccer star, win the presidential election in a run-off and inaugurated on January 22, 2018.

The new administration developed a four-pillar development strategy that focuses on: improving service delivery and support for marginalised groups; economic growth and diversification; the further consolidation of peace and security; and improved governance, transparency and accountability.

Despite an increase in its real Gross Domestic Product (GDP) from -1.6% in 2016 to 2.5% in 2017, the Liberian economy continues to experience persistent exchange rate and inflation pressures. The economic growth was driven by the mining and quarrying sector through increased gold production, which registered growth of 28.8% in 2017, from -33.0% in 2016.

Unfortunately, Liberia's GDP experienced a 1.25% decline from 2017 in 2018. It continued to plummet in 2019 to 0.4% but it is expected to recover to 1.6% in 2020, underpinned by mining, forestry, and agriculture.

The country is a member of the African Union, the United Nations and Economic Community of West African States (ECOWAS).

Traditionally, Liberia has relied on forestry (rubber and timber) and mining (gold, diamonds and iron ore) as major sources of income. The mining sector alone employs more than 100,000 people and has the potential to generate income and help reduce unemployment. Agriculture employs an estimated 70% of the population, mainly youth and women.

Economy

Liberia's population is still characterised by low levels of education and technical skills, which keep the economy from transforming its natural resources into wealth. In 2016, the unemployment rate was 2.15%. It declined to 2.03% in 2017 and remained steady until 2019.

Measured by the national poverty line, poverty declined from 64% to 54% between 2007 and 2016. The official inequality measure, the Gini index, declined from 36.5 in 2007 to 35.5 in 2016.

In the yearly World Bank survey on "Doing Business", a comparison of business regulation in 190 economies, Liberia is among the top 50% of countries. The 2020 edition of Doing Business ranks Liberia as 75 out of the 190 with a score of 88.9 out of 100 for the ease of starting a business. Next to this indicator the survey includes scorings for dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investments, paying taxes, trading across borders, enforcing contracts and resolving insolvency. Figure 2 provides a comparison of Liberia to similar economies for starting a business.

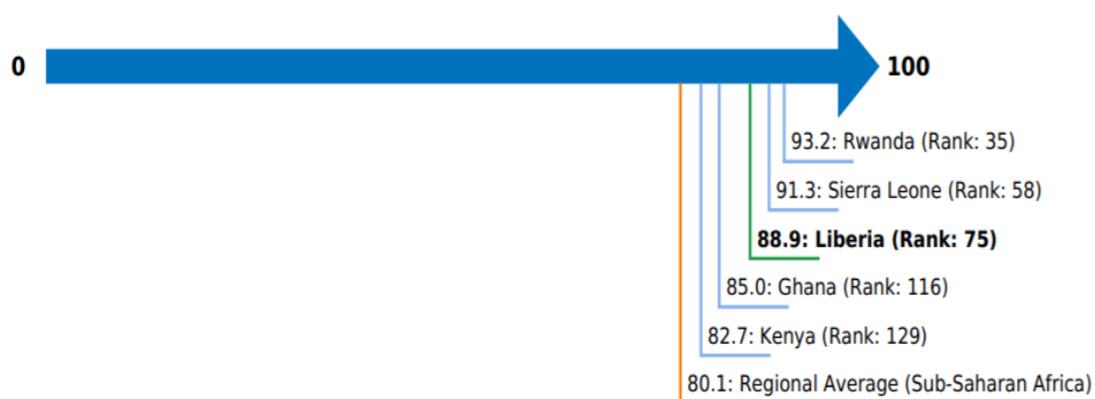


Figure 2: Doing Business 2020 score for starting a business. Data from: World Bank Group, 2020

The energy sector in Liberia

As of Q4 of 2019, the installed electricity generation capacity in Liberia was 126 MW. This is made up of 88 MW of hydro power and 38 MW of diesel and heavy fuel oils (HFO). Currently, approximately 16% of urban residents and 3% of rural residents have access to electricity from grid power while 832,000 households without grid power rely on self-generation with gasoline or diesel generators using expensive imported fuel.

The Government has set a target to provide rural electrification at a rate of 35% by 2030, benefitting about 1.3 million people through a combination of grid extension and decentralised grids. The national grid will develop mostly in the Growth Corridor area where the majority of the population is concentrated, thus electrifying 66% of all rural consumers. The large decentralised grids will represent 27% of the consumers with 5% for mini grids. Individual off-grid solutions will only bring electricity to 18,900 people (around 1%). 33% will be served by decentralised grids in excess of the 25% target established under the Renewable Energy Policy of ECOWAS.

In 2016 the Rural Energy Strategy and Masterplan was developed, and aims to achieve the following objectives:

1. Provide electrification to 65,000 customers by 2020, 140,000 by 2025 and 265,000 by 2035 outside Monrovia.
2. Electrify all County Capitals by 2025 through the national grid, decentralised grids or transitional mini grids.
3. Provide electricity to all health facilities and all secondary schools by 2025 through grid-based electrification or 100% solar-based individual solutions.
4. Ensure the 10 largest settlements in every county have no less than 15% electrification rate by 2030.
5. Establish a credit or subsidy mechanism for connecting poor and woman-led households through the Rural Energy Fund (REFUND).

The Ministry of Mines and Energy still has a number of energy projects in its pipeline, some of which were paused due to the outbreak of the Ebola Virus. These include four renewable energy related projects, ranging from solar to biomass.

Though the Liberian energy sector still faces challenges, such as an under-developed enabling environment and high tariff and commercial losses, the government has set out motivations for investors interested in the sector through:

1. Unbundling Power Sector activities and award selected activities to Independent Private Operators through clear and transparent mechanisms that aim to enable private sector participation.
2. Enforcing the Regulated Buyer Model which aims to de-risk Renewable Independent Power Producers' investments.
3. Exemptions from trade taxes for machinery, equipment, raw materials, semi-finished products and other supplies to be used in a project in selected sectors.

Table 2: Overview of the main stakeholders in the energy sector in Liberia

Institution	Role
Liberia Electricity Corporation (LEC)	To produce, supply and expand economic and reliable electric power
Ministry of Mines and Energy	To administer all activities relative to land, mineral, water and energy resource exploration, coordination and development. To formulate, implement and monitor policies and regulations in collaboration with other sector related agencies for the delivery of efficient services. To promote research programmes and activities supporting the development of new and alternative renewable sources of energy.
Rural and Renewable Energy Agency (RREA)	Facilitates and accelerates the economic transformation of rural communities through the private sector and community initiatives. Promotes commercial development and supply of modern energy products and services to rural communities. Manages the Rural Energy Fund (REFUND) that facilitates and provides for the coordination and sustainable financing of energy projects and programmes.
Ministry of Public Works	To survey, draft and design construction and supervising construction contracts, and the maintenance of roads, bridges, and public buildings.

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	<p>Bureau of Community Services (BCS): create integrated rural development processes including community awareness and sensitisation around infrastructure, water and sanitation projects.</p> <p>Bureau of Rural Development (BRD): construct and maintain feeder and farm-to-market roads and introduce research activities aimed at the development of indigenous materials and methods of construction.</p>
Environmental Protection Agency	Principal authority for implementing the national environmental policy and sustainable management law for the protection of natural resources.

Small hydropower

According to the Rural Energy Strategy and Masterplan, hydropower potential of 2300 MW has been identified. This potential is mainly on large rivers with high mean annual flow and low heads. Several locations have flows above 50 m³/s, so are good for above 5 MW hydro schemes. However, Liberia's hydro potential is subject to high intra-annual variation with significant reduction in production during the dry season, requiring combination with other generation sources and benefitting from the inclusion of peaking ponds.

The two small hydropower projects in Liberia are a 2.5 MW plant commissioned in 2016 under the World Bank Liberia Renewable Energy Access Project in Lofa County in north-west, and the Gbedin Waterfalls 9.34 MW hydro project funded by the Africa Development Bank, in Nimba County in north-eastern Liberia.

Solar energy

Solar insolation is very intensive in all parts of the country. The potentials for solar energy are relatively high especially during the six months of the dry season. It is consistent across the country, with an average level of 1712 kWh/m²/year and potential for generation of 1400 to 1500 kWh/kWp.

In its RESMP, Liberia plans on installing at least 20 MW of solar energy on the national grid by 2020 and 60 MW by 2030.

Given the potential for power generation through solar, the country has yet to fully tap into its potential for electricity but is increasing steadily. In 2016 and 2017, 2 10 MW solar photovoltaic plants were commissioned by the Liberian Government.

In 2018, Gigawatt Global received funding to construct a 20 MW solar power plant in Northern Liberia which will see a 15% increase in total power generation.

The Liberian Sustainable Energy For All (SE4All) Action Agenda of 2015 included the distribution of 10,000 solar lanterns to households under the Scaling-up Renewable Energy Program (SREP). The Ministry of Mines and Energy also had the Rural Renewable Energy Assessment (RREA) programme halted due to lack of funds. The initial target was 15 counties but only saw assessment done in 5 eastern counties. There is still a need to complete the programme in the remaining 10 counties as well as identify plans and conduct a technical analysis that will inform the completion of the programme.

Biomass energy

According to the International Energy Agency (IEA), World Energy Outlook 2015, in Liberia the percentage of the population relying on traditional use of biomass for cooking was 98% in 2013.

As of 2015, about 85% of the current annual energy consumption in the coastal regions was charcoal and 9% firewood, while the hinterland used up to 90% firewood and 9% charcoal as the sources of fuel for cooking, heating and drying. Modern energy services based on electricity and petroleum products are predominantly used for economic production and transportation.

Liberia is also testing innovative processes of generating power for small-scale projects through small biomass gasifiers, with the support of academic institutions such as Booker Washington.

Large-scale rubber plantations and an abundance of palm trees generate considerable amounts of wood residues from pruning and replanting activities, which encourage charcoal production. In a bid to promote use of renewable energy, Liberian Government, in line with the ECOWAS Regional Renewable Energy Policy, aims to install at least one 5 MW biomass power plant on the national grid by 2020. It continues to provide support through a number of public and private sector led initiatives, such as Palm Oil Generated Electricity in Surlumba, Lofa by USAID (3 kWA), promoting improved cookstoves by EnDev and electricity from rubber wood chips in Kwendin, Nimba by RREA (100 kW).

Wind energy

According to the Liberia Sustainable Energy for all (SE4All) Action Agenda in 2015, Liberia has very little or no potential for wind energy that can be commercially exploited in Liberia. However, the coastal and highland regions might have prospects though no systematic data has been assessed on the resource.

Mini-grid sector development

Liberia is one of the countries in SSA looking to take a decentralised approach in its electrification plans. The government estimates that to achieve universal electricity access, about 11% of the population (about 7,000 small remote settlements) would have to be served by off-grid systems.

The government aims to electrify up to 68% of its population through approximately 150 mini grids by 2030. One of the strategies is to implement a decentralised grid programme to serve 10 of the largest settlements in the country through solar-diesel mini grids. This programme, estimated to cost \$292 million, will translate to connection of over 96,000 households from about 24 decentralised grid projects. These projects are broken down into four main components as highlighted below. It is, however, not clear whether most of these plans are being implemented.

- Solar-diesel mini grids: to electrify at least four towns where the national grid may not reach beyond 2030
- Cross-border distribution: to promote cross-border transmission from Cotê d'Ivoire to serve eight sites, and to supplement additional power with eight decentralised systems (implemented in 2017)
- Decentralised generation systems to supplement power from the cross-border systems above in seven sites
- Micro-hydro and biomass systems to serve communities in six sites

The government of Liberia has historically used concessions to involve the private sector in the energy sector. As such, most of the off-grid energy policies favour projects that have a concession agreement with the government as shown below.

- 100% import duty exemption for renewable energy equipment and other capital goods from the start of the contract up to when commercial production begins
- 100% property tax exemption for contracted renewable energy projects

- Special tax incentives for 5-15 years for renewable projects that do not have a concessional agreement with the government; the tax incentives depend on cost of equipment, local raw material content, location, and jobs created

The government also set up a Rural Energy Fund (REFUND) under the national energy policy. The REFUND, managed by the Rural and Renewable Energy Agency (RREA), provides end-user financing to promote affordability of energy through grants to match community contributions, or individual loans through micro-finance institutions (MFIs). In addition, the fund offers full or partial guarantees for approved projects to help with getting local currency financing.

Despite these progressive plans to improve energy access through decentralised systems, some fundamental barriers prevent more active involvement of the private sector in the mini grid space:

- The roles of different actors along the electricity supply chain still remain unclear, making regulation a challenge
- By 2017, the country did not yet have a framework set up for mini grid licensing and concessions, or standardised power purchase agreements
- In addition, policy is not clear on what will happen to developers' investments if the main grid arrives

As of 2018, only about 10 mini grids of capacities between 22 kW and 60 kW were operating in Liberia. Nine of them are operated by a local cooperative, and one is operated by a private company.

Table 3: Active off-grid programmes

Programme	Main activities
Regional Off-Grid Electrification Project (ROGEP)	<p>A \$200 million project funded by World Bank and managed by ECREEE. A regional programme with a focus on mobilising private sector investment in the off-grid electrification space.</p> <p>The project has three main components:</p> <ul style="list-style-type: none"> • Technical assistance to public and private sector • Access to finance for off-grid energy projects through local financial institutions • Support to electrify public institutions
Renewable Energy for Electrification in Liberia	A mix of debt and grant funding to develop a 9.34 MW hydropower project in Gbedin Falls.
Solar for Health project	Funded by UNDP, targeting 12 health centres in seven counties in Liberia. The solar systems, installed by UNDP, are currently being managed by Eco-Power, a local private company.
AECF/REACT SSA	Funding support for solar home system companies, mini grid companies, clean cook stove companies, innovative distribution models for off-grid energy, and

Table 3: Active off-grid programmes

	<p>innovative ideas to stimulate “next generation” approaches to renewable energy. \$6 million dedicated funding for Liberia.</p>
Beyond the Grid Fund for Africa	<p>A multi-year programme funded by the Swedish Government, managed by NEFCO and implemented by REEEP. The programme aims to “bring clean, affordable off-grid energy access to millions of people in Burkina Faso, Liberia, Mozambique and Zambia”, by replicating the results from the first round activities in Zambia which commenced in 2016.</p> <p>\$10 million dedicated funding for Liberia to facilitate access to sustainable clean energy to rural and peri-urban underserved. \$7 million available for capital support to energy providers.</p> <p>Currently in the market scoping stage.</p>
Liberia Renewable Energy Access Project	<p>Support expansion of access to affordable, reliable, year-round electricity services to at about 50,000 people in North Lofa County, an economic and agricultural hub in North-West Liberia. Offers technical assistance to strengthen rural electrification institutions and regulations as well as market development of stand-alone solar systems.</p>
Concessions in South East	<p>Technical assistance on how the private sector can be attracted to five major settlements in the South East (the first financial pre-feasibility study to be conducted in Gbarnga city).</p>

Industry associations

Rural and Renewable Energy Agency is an independent agency of the Government of Liberia, which aims to facilitate and accelerate the economic transformation of rural Liberia by promoting the commercial development and supply of modern energy products and services to rural areas through the private sector and community initiatives. The RREA works closely with Liberia’s private sector and community developers to investigate how entities can be encouraged to bring electricity to the rural areas. In addition to training and outreach, the RREA provides financial support such as grants, subsidies and loan guarantees to rural communities and the private sector.

References and further reading

Rural Energy Strategy and Master Plan for Liberia – 2030

<http://gestoenergy.com/wp-content/uploads/2018/04/LIBERIA-RURAL-ENERGY-STRATEGY-AND-MASTER-PLAN.pdf>

Sustainable Energy 4 All Action Plan 2015 – Liberia

https://www.seforall.org/sites/default/files/LIBERIA_AA_EN_Released_0.pdf

REPP Africa – Solar Power Plant – Mount Coffee

<https://repp.energy/project/mount-coffee-liberia/>

Millennium Challenge Corporation – Hydro Power Plant Liberia Compact

<https://www.mcc.gov/where-we-work/program/liberia-compact>

Doing Business

<https://www.doingbusiness.org/content/dam/doingBusiness/country/l/liberia/LBR.pdf>

Official UK Government travel advice for Liberia

<https://www.gov.uk/foreign-travel-advice/liberia>

SE4All - Rapid Assessment Gap Analysis (RAGA) Liberia

www.se4allafrica.org/fileadmin/uploads/se4all/Documents/Country_RAGAs/Liberia_RAGA_EN_Released.pdf

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