



Project Information Document (PID)

Concept Stage | Date Prepared/Updated: 08-May-2024 | Report No: PIDC37595

**BASIC INFORMATION****A. Basic Project Data**

Country Liberia	Project ID P180498	Parent Project ID (if any)	Project Name Liberia Electricity Sector Strengthening and Access Project (LESSAP) Phase II (P180498)
Region WESTERN AND CENTRAL AFRICA	Estimated Appraisal Date May 27, 2024	Estimated Board Date Jun 21, 2024	Practice Area (Lead) Energy & Extractives
Financing Instrument Investment Project Financing	Borrower(s) Republic of Liberia	Implementing Agency Rural and Renewable Energy Agency, Liberia Electricity Corporation	

Proposed Development Objective(s)

The PDO is to expand the access to electricity services, and enhance the operational performance of the Liberia Electricity Corporation (LEC).

PROJECT FINANCING DATA (US\$, Millions)**SUMMARY**

Total Project Cost	35.70
Total Financing	35.70
of which IBRD/IDA	30.00
Financing Gap	0.00

DETAILS**World Bank Group Financing**

International Development Association (IDA)	30.00
IDA Credit	30.00

Non-World Bank Group Financing

Trust Funds	4.20
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Energy Sector Management Assistance Program	4.20
Commercial Financing	1.50
Unguaranteed Commercial Financing	1.50

Environmental and Social Risk Classification

Moderate

Concept Review Decision

Track II-The review did authorize the preparation to continue

Other Decision (as needed)

B. Introduction and Context

Country Context

- The Liberia LESSAP Program MPA was approved by the World Bank Board on March 12, 2021, for a total financing envelope of IDA US\$190 million, with the Program Development Objective (PrDO) “Increasing access to sustainable, reliable and affordable energy in the program areas in Liberia”.** At the time of approval of the parent MPA, the first phase was approved as an Investment Project Financing (IPF), with an IDA financing of US\$59 million and US\$5.2 million co-financing from trust funds (Energy Sector Management Assistance Program (ESMAP) and Japan Policy and Human Resources Development Fund (PHRD)). The Project Development Objective (PDO) of the first phase is to “Increase access to electricity and improve the operational efficiency of Liberia Electricity Corporation (LEC)”. The first phase has four components: (a) Rehabilitation and Expansion of Electricity Infrastructure and Systems and Access Expansion, (b) Electrification of Health Centers and Households in Off-grid Rural Areas, (c) Technical Assistance for Institutional Reform, Capacity Building of Sector Institutions, and Implementation Support to LEC, and (d) Emergency Sustainable Generation Support. The closing date of the first phase is June 30, 2026. The MPA design envisaged three phases, and that the phases would overlap with each other to ensure continuity of support and build on the momentum expected in the first phase.
- The financing amount for the proposed second phase of the MPA is expected to be US\$ 33 million, with US\$30 million of IDA credit and US\$3 million of ESMAP grant as per the original MPA framework.** The proposed second phase will be implemented by the Liberia Electricity Corporation (LEC) and the Rural Renewable Energy Agency (RREA) as an IPF, in line with the Program PrDO of the MPA. The second phase would scale-up the activities initiated under the first phase. Specifically, financing would be provided for (a) rehabilitation, upgrade and expansion of the distribution network in and around Monrovia, and implementation of the revenue protection program, and (b) stand-alone systems for households, public institutions, and mini grids in remote and dispersed communities of Liberia; and (c) Technical Assistance for Institutional Reform, Capacity Building of Sector Institutions, and Project Implementation Support.



- 3. Liberia's economy is still recovering from a protracted period of weak economic and social performance.** After the civil war, the economy grew steadily, at 7.4 percent on average, from 2004 to 2013. This period of sustained growth was followed by successive exogenous shocks: the Ebola outbreak, the collapse in iron ore and rubber prices, the economic impact of the drawdown of United Nations peacekeeping forces, and the COVID-19 pandemic. Liberia's economy expanded by 4.7 percent in 2023. The expansion in 2023 was driven mainly by mining, specifically gold production. Growth in the primary sector was sluggish – 1.4 percent as output of key agricultural products such as rubber and crude palm oil declined during the year. Output in the secondary sector expanded by 13.9 percent led by mining largely driven by increased gold production. Growth in services picked up slightly from 2.8 percent in 2022 to 3.8 percent in 2023. Headline inflation declined from 7.8 percent in 2021 to 7.6 percent in 2022 but took off to an average of roughly 10.1 in 2023 due to higher food prices and weaker domestic currency.

Sectoral and Institutional Context

- 4. Liberia's access to electricity is well below the regional average.** Approximately 33.2 percent of the population in Liberia has access to electricity, of which about 25 percent being connected to the Liberia Electricity Corporation (LEC) grid. In 2020, the Government approved the National Electrification Strategy (NES). The NES, which was supported by the World Bank, provides a roadmap to universal access by 2030 through a combination of grid expansion and densification and off-grid solutions. Grid expansion and densification will be the least-cost option to reach 70 percent of new connections while the remaining 30 percent of new connections could be served by mini-grids and stand-alone solar systems.
- 5. Transition to a full-time, sustainable local management team turned around LEC's performance.** LEC was primarily operated under Management Service Contracts since its re-establishment after the end of the war for over nine years. However, under the first phase of the LESSAP MPA, the company has successfully transitioned to a full-time local management team in July 2021. The successful transition to the local management team has led to a significant improvement in LEC's operational performance. Commercial losses have dropped substantially from about 47.7 percent in 2021 to about 41.3 percent in 2022 and 31.4 percent in 2023 while the number of customer connections has increased from 142,947 connections in 2021 to 199,441 connections in 2022 and 282,505 connections in 2023. The percentage of energy billed has also increased from 34% in 2021 to 51% in 2023. Despite these improvements, LEC continues to face significant challenges, including the need to improve its governance, network reliability, reduction in excessive operating costs and overall reduction in the Aggregate Technical and Commercial losses. Additionally, there is a need to build capacity among the local staff to sustain and improve the operations of the Utility.
- 6. Limited Transmission and Distribution infrastructure, generation capacity and lack of financing for new connections continue to constrain LEC's ability to increase its customer base to foster economic growth.** Investments for the reconstruction of the Transmission and Distribution networks lagged the generation projects, resulting in the underutilization of generation resources, especially in the wet season when Mt. Coffee is operating at full capacity. Currently, the transmission network consists of radial 66-kilovolt (kV) lines interconnecting four 66/22-kV substations. A few backbone 22-kV lines distribute power from these substations mostly along the main roads and streets without extensive reach within the communities. The limited reach of the low-voltage (LV) network leaves a substantial part of the communities without access even though the grid has technically arrived in those communities. LEC currently has over 282,000 legal connections, with its grid footprint limited to the capital Monrovia and its surrounding areas. LEC will also need to expand its generation capacity to meet the increasing power demand and enhance the system reliability, particularly during dry seasons when the hydropower generation is low. The inability of LEC to meet massive connection demands, high tariffs, and the lack of effective revenue protection programs, particularly for the large



users, has created an opportunity for widespread illegal connections and power theft.

- 7. The investments proposed under the second phase of the LESSAP MPA will help address the poor operational and commercial performance of LEC leading to a financial turnaround of LEC as well as the low access to electricity to allow for achieving universal access to electricity within a reasonable timeframe.** These include rehabilitation and expansion of the electricity infrastructure and systems, and enhancement of LEC financial performance through a revenue protection program; off-grid electrification of households and public facilities and stimulation of productive uses in rural areas; and technical assistance, training and capacity building of sector institutions and project implementation support.

Relationship to CPF

- 8. The proposed project will support Liberia in achieving the targets of the Africa Energy Access Initiative of the World Bank.** Despite decades of efforts, 640 million people currently live without electricity in Africa – 210 million of whom are in countries plagued by Fragility, Conflict, and Violence (FCV). Average annual electricity consumption per capita in SSA (Sub Saharan Africa) excluding South Africa was 100 kWh in 2015, barely enough to power one light bulb per person for a few hours each day while only one in three health facilities and schools in the region has access to electricity today. Considering the huge access deficit, the Africa Energy Access Initiative of the World Bank is aimed at mobilizing resources to ensure that no country will have below 50 percent electricity access by 2026 and to meet the aspirational goal of universal access by 2030.
- 9. The proposed project is aligned with the objectives of IDA 20 and the World Bank Group's and African Development Bank's joint initiative to provide at least 300 million people in Africa with electricity access by 2030.** By providing electricity access to households and businesses in one of the poorest countries in the world, the proposed project will bring about a transformative impact on the lives of thousands of people through inclusive growth, job creation, and improved services for women-led households. By helping to transition to a long-term sustainable management for LEC and supporting measures to improve its operational efficiency, the proposed project will help build the foundation for an accelerated grid expansion.
- 10. The Program relevance to the CPF remains unchanged.** The proposed Program is aligned with the Liberia Country Partnership Framework (CPF) FY19-FY24 which highlights the need for enhanced access to affordable and reliable electricity through Liberia's renewable energy sources and improved regional energy trade. The CPF identifies the expansion of electricity services and its affordability for businesses, households and public institutions as a necessary intervention to address constraints to economic growth, human capital development and poverty reduction. The proposed second phase is consistent with the WBG's enhanced mission and will contribute to achievement of the WBG's ambition to provide at least 300 million people in Africa with electricity access by 2030. It will significantly boost efforts to increase access and improve the quality of electricity services for economic activities, job creation, and improved living standards. This will directly support human capital development through the provision of sustainable, uninterrupted electricity services to health facilities.
- 11. The proposed second phase will help to strengthen an enabling environment for greater private sector participation in development of renewable energy in Liberia.** Building on gains made under the first phase of the MPA and from previous Bank-supported policy reforms under the budget support operations, the second phase of the MPA will support scaled up deployment of solar home systems through direct and indirect subsidies under Results Based Financing. The objective of the second phase would be to build local companies distribution networks and improve private sector participation. The first phase of the MPA also conducted a detailed pre-feasibility assessment of 47 sites



for mini-grid development. The second phase of the MPA will support development of first private sector led mini-grids where performance-based grants will be awarded competitively to private sector developers, for preferred site development. This would be implemented through performance-based grants on capex subsidy with the remaining financing leveraged by the private sector. The second phase of the MPA program is therefore aligned with the WBG's Maximizing Finance for Development by strengthening the enabling framework for private sector participation in renewable energy generation development.

12. The proposed Project is aligned with the World Bank Group Gender Strategy. The 2016–2023 WBG Gender Strategy underlines key gender gaps and promotion of gender equality. In particular, it emphasizes improving human endowments, removing constraints on increased female participation in the labor market including in Science, Technology, Engineering, and Math (STEM) fields, and enhancing women's voice through strategically supporting female participation in leadership and decision-making positions in the energy sector. The project design will include targeted interventions to improve female employment and career growth opportunities in the off-grid sector.

C. Proposed Development Objective(s)

13. The proposed second phase development objective is to expand the access to electricity services, and enhance the operational performance of the Liberia Electricity Corporation (LEC).

Key Results (From PCN)

14. The key results include:

- a) People provided with access to electricity (number);
- b) MSMEs provided with new or improved electricity for productive use (number);
- c) Public institutions provided with new and improved electricity services (number);
- d) Renewable energy enabled (MW);
- e) LEC non-technical losses reduced (percentage);
- f) Private capital mobilized (US\$).

D. Concept Description

15. The investments proposed under the second phase of the LESSAP MPA will help address the poor operational and commercial performance of LEC leading to a financial turnaround of LEC as well as the low access to electricity to allow for achieving universal access to electricity within a reasonable timeframe. These include rehabilitation and expansion of the electricity infrastructure and systems, enhancement of LEC financial performance, off-grid electrification of households and public facilities and stimulation of productive uses in rural areas.

16. The proposed Project will support the following components:

17. Rehabilitation and Expansion of Electricity Infrastructure and Systems and Enhancement of LEC Revenue Protection: This will expand the supply and installation of the Supervisory Control and Data Acquisition (SCADA) System initiated under the first phase the MPA to ensure oversight, proactive network problem detection and resolution, adequate network reliability and requisition of required power quality data for real time operational decision. The component will also support the LEC Revenue Protection Program which will include various activities: (i) Enhance the installation



of an advanced-metering infrastructure (AMI) platform under the first phase to include the connection and monitoring of large commercial customers via Meter Data Management (MDM), ensuring accurate measurement of their consumption and prevent tampering with metering systems; (ii) Procurement of 50,000 prepayment meters for households that will support the replacement of damaged meters, new connections and regularization of illegal connections; (iii) Enhancements to the LEC Integrated Management System through the addition of a Geographic Information System (GIS), a Field Service Management System (FSMS), installation of a mobile add-on to the Enterprise Asset Management module and the implementation of the Asset and Customers Mapping Survey (ACMS) for LEC to have accurate information at the point of sale of electricity due to the outdated and inaccurate customer database.

18. Off-grid Electrification of Households, Public Facilities, and Stimulation of Productive Uses in Rural Areas: This component will scale up the activities under the first phase off-grid electrification component with a focus on mobilizing private capital. This will include electrification of public facilities in rural areas through provision of Solar PV services to selected health facilities to enhance the delivery of healthcare services and improve their resilience, as well as electrification of pilot education facilities. The project will initiate with identification of education facilities, conduct energy surveys for categorization of sites and build a standardized, modular approach similar to the design of health facilities electrification implemented under the first phase of MPA. The project will also scale up deployment of productive use enterprises and solar home systems for residential end-users, by injection of subsidies through Results-based-Financing, to ensure affordability of solar home systems for households in vulnerable communities and provide an enabling environment for strengthening the distribution network of local companies. The second phase of the MPA would also benefit from an online RBF platform currently under implementation under the first phase which automates the claiming processes and improves efficiency for deployment of the RBF subsidies. The project will support the design and implementation of privately delivered mini grids to dispersed communities. The first phase has already conducted detailed pre-feasibility assessments of 47 sites and conducted financial viability of each site to calculate subsidy levels. The pilot will be used to demonstrate the technical and commercial viability of mini-grid development in Liberia and its attractiveness to the private sector.

19. Technical Assistance, training and capacity building of sector institutions and project implementation: This will cover the cost of strengthening the capacity of LEC Project Management Team (PMT) to manage and monitor implementation activities. It will include financing the cost of specialized consultants (technical, financial, procurement, audit, safeguards, etc.) and project staff to support the PMT, the preparation of technical design and safeguards documents, community engagement and sensitization programs, working on inclusivity and implementation of gender actions plans amongst others.

Legal Operational Policies	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Areas OP 7.60	No

Summary of Screening of Environmental and Social Risks and Impacts

20. The environmental impacts during the construction phase will include construction site waste generation, soil erosion and sediment from excavation activities, site preparation activities, fugitive dust and other emissions (e.g.,



from vehicle traffic, and materials stockpiles), and noise from movement of equipment and truck traffic, potential for hazardous materials and oil spills associated with heavy equipment operation and fueling activities, among others that are typical to medium-scale electrical installation works.

During the rehabilitation and operation phase, handling and disposal of hazardous chemicals used in transformers such as mineral insulating oils, and disposal of faulty meters collected as per subcomponent 1b might also pose environmental risks. Where wood poles are used for distribution networks, the use of chemicals for wood preservation and disposal of used poles might pose environmental, health, and safety risks. There are also potential health and safety risks and hazards to workers (e.g., working at heights, close to live power lines, electric and magnetic fields, etc.), as well as to the community. Many of these risks and impacts are site-specific and manageable with appropriate mitigation measures.

Component 2 includes scale-up support to off-grid solar systems (OGS) under Phase 1, this will include the mounting of the solar modules on rooftops or mount them on poles next to the users' homes or buildings, which will reduce the fossil fuel-based energy production dependency. While the Battery Storage System for the OGS is not complex and would have a small installation footprint, there are several environmental risks associated with this activity that need to be managed. In particular, potential fire and explosion risks and environmental risks and hazards related to the disposal of end-of-life batteries containing hazardous materials.

Proper disposal or recycling of spent batteries at the end of their life, which is usually 3-5 years, is the main concern. The activities under component 1 will not require involuntary land acquisition: (i) construction of lines for the distribution network (MV and LV) because they are expected to be installed in the existing ROW of the roads; and (ii) the OGS modules are expected to be installed on the roof of buildings or the poles for the streetlights. The initial screening under phase I, indicated that no land will be required since the MV and LV line will be installed along the right of way of existing road and communities. However, it has the potential to temporarily restrict access and disturb economic activities, labour accidents, and facilitate the perpetuation of gender inequalities through unequal employment opportunities for vulnerable groups. The project aims to improve the efficiency of the implementing entity by strengthening and reorganizing management to improve its capacity and reduce commercial loss. Its OGS intervention will lead to improvements in energy resilience and efficiency and the decrease of CO2 emissions through the integration of more clean electricity from renewable sources. Overall, the project will have significant positive benefits at the household, public, and national levels. Despite positive benefits, there are several potential E&S risks and impacts associated with the project that will need to be mitigated. The locations for installation of MV and LV lines have been concluded and screened under Phase I with manageable risk. Similarly, the specific beneficiary health facilities and schools have been selected under Phase I.

The project interventions will enhance the quality of life. The proposed distribution line will not need to acquire or restrict land use. The unused space of ROW of existing roads, streets, avenues, etc. shall be used for the energy distribution using mitigation hierarch to avoid any impacts on the people or community. Thus, no significant E&S or cultural risks or impacts are anticipated. The initial community consultations and engagements have shown very positive response for the project. Based on the nature of potentially adverse social impacts that are likely to be moderate, site-specific, if any, and manageable with appropriate mitigation measures. No significant negative on the health, safety and well-being of workers and project affected communities or risks on the cultural heritage have been anticipated.

The Borrower will update, disclose and adopt the ESMF and RPF prepared under Phase I for Phase II, which will then guide the preparation of subsequent E&S screening and ESMPs according to ESF, GIIP, and WB EHS Guidelines. The



Borrower is required to update and adopt the SEP prepared under Phase I, SEA/SH Action Plan. The Existing ESCP for Phase I will be updated for Phase II to address the environmental and social obligations of the borrower as by the relevant ESSs and national regulations.

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APPROVAL

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