



Project Information Document (PID)

Appraisal Stage | Date Prepared/Updated: 14-Nov-2022 | Report No: PIDA34610



BASIC INFORMATION

A. Basic Project Data

Country Western and Central Africa	Project ID P179267	Project Name Regional Emergency Solar Power Intervention Project	Parent Project ID (if any)
Region WESTERN AND CENTRAL AFRICA	Estimated Appraisal Date 07-Nov-2022	Estimated Board Date 20-Dec-2022	Practice Area (Lead) Energy & Extractives
Financing Instrument Investment Project Financing	Borrower(s) Republic of Chad, Republic of Liberia, Republic of Sierra Leone, Republic of Togo	Implementing Agency Electricity Distribution and Supply Authority (EDSA), Liberia Electricity Corporation (LEC), Societe Nationale d'Electricite du Tchad (SNE), Togolese Rural Electrification and Renewable Energy Agency (AT2ER), West African Power Pool (WAPP) Secretariat	

Proposed Development Objective(s)

The project development objective is to rapidly increase grid-connected renewable energy capacity and strengthen regional integration in the participating countries.

Components

- Component 1: Construction of Solar PV with BESS and Grid Connections
- Component 2: Expansion of Mt. Coffee Hydro Power Plant and Dam Safety Enhancement
- Component 3: Transmission and Distribution Upgrades
- Component 4: Regional Coordination, Institutional Strengthening, Implementation Support and Technical Assistance

The processing of this project is applying the policy requirements exceptions for situations of urgent need of assistance or capacity constraints that are outlined in OP 10.00, paragraph 12.

Yes

PROJECT FINANCING DATA (US\$, Millions)

SUMMARY



Total Project Cost	311.00
Total Financing	311.00
of which IBRD/IDA	311.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Development Association (IDA)	311.00
IDA Credit	156.00
IDA Grant	155.00

Environmental and Social Risk Classification

High

Decision

The review did authorize the team to appraise and negotiate

Other Decision (as needed)

B. Introduction and Context

Country Context

- 1. The West Africa sub-region has one of the lowest electrification rates coupled with some of the highest electricity costs in Sub-Saharan Africa.** Countries faced with poor infrastructure, high losses and inadequate generation capacity have tried to meet demand through oil-based Emergency Power Plants (EPPs), resulting in high costs of electricity supply. Rising oil prices have further increased the liabilities of electricity utilities, who are unable to pay for their power purchases and often turn to the government for additional support to keep the lights on. With very limited fiscal space to support the rising sector arrears, countries are staring at an acute power supply crisis that threatens to upend their economic growth. Participant countries are facing a severe power supply crisis that is feeding into fiscal instability. Liberia, Sierra Leone and Chad are facing huge electricity purchase bills due to the rising oil prices and the importance of liquid fuel generation in their energy mix. The three countries are facing somewhere between 0.5-1 percent of GDP in increased fuel purchase costs creating a fiscal crisis. Civil strife in Sierra Leone has already taken scores of lives and widespread outages in Liberia have heightened tensions. On the other hand, Togo is experiencing security challenges in the Northern region and with limited supply of electricity and other infrastructure services the country’s ability to address this situation is severely constrained.



2. **The proposed Regional Emergency Solar Power Intervention (RESPITE) Project will form part of the World Bank Group (WBG) response to the energy crisis faced by the region.** Instead of offering support to fuel purchases, as was done in the past, the WBG aims to wean countries away from heavy fuel oil (HFO) and diesel power generation by taking a different approach: scaling-up renewable power generation and improving capacity for energy trade in the future. The Bank through RESPITE will support public procurement of emergency renewable power generation that can help set a benchmark for greater private sector deployment of renewables in the future. At the same time, the project will support associated investments in transmission and distribution (T&D) infrastructure needed to use the new generation capacity as well as technical assistance to further facilitate regional energy trade in the future. The RESPITE project proposes a new approach that is line with the Bank’s commitment to support countries in their energy transitions while addressing the immediate crisis. The regional approach developed for RESPITE i) provides economies of scale; ii) increases regional trade through development of power capacity and optimization and synchronization of infrastructure; and iii) develops regional public good by facilitating knowledge sharing and capacity building.
3. **Apart from the direct financial and other quantifiable economic benefits, the regional approach will facilitate knowledge sharing for accelerated development of renewable energy in West Africa and also enable greater energy trade in the future.** It will support regional integration and power trade, lead to reduction in transaction costs, attract international private developers and foster a genuine regional knowledge exchange. More specifically, the proposed intervention will connect at least 65 MWp (51 MW) of solar generation and 41 MW of hydro power to the CLSG interconnector available for regional trade, it will support synchronization of the West African Power Pool (WAPP) network and provide further technical assistance for regional integration. The Project will bring the four countries together, help build trust, and support knowledge sharing as they learn from each other’s experience deploying solar. Finally, by aggregating the procurement, the intervention will help attract larger private players that are usually not engaged in the region.
4. **RESPITE is aligned with the ongoing WBG’s Country Partnership Frameworks (CPF) for Sierra Leone, Liberia, Chad, and Togo.** The Country Partnership Framework (CPF) for Sierra Leone for FY 21-24 aims to improve the reliability of supply to enhance competitiveness of the country’s economy. In Liberia, the CPF for FY19-24 targets expansion of reliable electricity services to narrow the infrastructure gap to foster more equitable development in the country. In Chad, the CPF for FY16-20 recognizes the importance of the energy sector as part of Engagement Theme 1 focused on strengthening the management of public resources, which includes the energy sector, while the CEN for FY23-FY24 (under preparation) envisages investment in energy sector under Focus Area 3 (Resilient Productivity and Connectivity) to address of the greatest binding constraint to Chad’s growth and broader economic activity. In Togo, the CPF for FY17-FY20, calls for strengthening energy services to improve private sector performance and job creation.

Sectoral and Institutional Context

5. **Sierra Leone:** The power sector is almost entirely under government ownership and sector institutions have very limited capacity to meet the demand imposed on them. The National Electricity Act, 2011 (the Electricity Act) established two state-owned enterprises: (a) the Electricity Generation and Transmission



Company (EGTC) and (b) the Electricity Distribution and Supply Authority (EDSA). EDSA, the distribution utility, has high losses and low collections, and is unable to pay for its power purchases or meet current demand in the country. Sierra Leone has been experiencing power supply shortage and outages since 2021 as EDSA struggles to pay for power purchases from its biggest supplier of electricity, Karpowership (KP- an IPP). During the dry season Bumbuna hydro capacity drops to less than 5MW, leaving Karpowership as the only source of electricity for Freetown. With high losses, low collections and USD 100/barrel oil prices due to war in Ukraine, EDSA is unable to cover the costs of purchasing electricity from KP. Consequently, KP keeps reducing its generation output or shutting down operations frequently. The increasing arrears and continued load shedding have not only created a crisis in the power sector but threatens to disrupt the country's fragile economy as well. Sierra Leone's Integrated Resource Plan identifies solar as the least-cost solution with its low cost to replace thermal generation. It proposes the development of up to 100MW of solar through 2025 and another 80MW of solar and storage by 2027; the initial investment is defined as 45MWp solar in 2022.

6. **Liberia:** There has been some modest progress in reforming the energy sector, but institutional capacity remains a significant issue. The sector remains entirely government controlled with the Liberia Electricity Company (LEC), the vertically integrated utility responsible for generation, transmission and distribution. Liberia has one of the lowest electrification rates (28 percent) in the world and a high grid tariff (24 ¢/kWh) with LEC, the sector utility, facing financial issues. Despite having one of the highest tariffs in the world (US\$0.24/kWh), the financial situation of LEC is precarious, propelled by a vicious cycle of a high tariff that incentivizes electricity theft, which subsequently necessitates a higher tariff. The decade-long civil war destroyed the electricity infrastructure, including the main generation source of the country (Mt. Coffee hydropower). The least cost generation expansion plan has identified 90MW of grid connected solar plants (to be implemented in phases) and the expansion of the existing hydropower plant of Mt. Coffee as part of the least cost options for meeting the electricity needs of Liberia. It is expected that roughly 20 MW of grid connected solar could be set up in the first phase on an emergency basis, which would help address the current supply shortages by complementing the Mt. Coffee hydropower running up to the dry season and become a main source of supply during the dry season. The 41 MW hydropower expansion would provide low-cost power to replace expensive thermal power plants during the rainy seasons.
7. **Chad:** Despite the endowment of fossil fuels and excellent solar resources, Chad has one of the lowest electricity access rates in Africa at 6.4 percent. The national power utility, Societe Nationale d'Electricite du Tchad (SNE), has been facing several systemic issues that prevented it from expanding the power sector in Chad. With revenues well below costs and reliance on the central budget to cover a considerable share of operating costs, SNE faces chronic cash shortages making it impossible for the company to maintain its assets and attract private investment in power generation. Moreover, the remarkable solar energy potential remains unrealized. Solar energy is by far the most abundant renewable energy resource in Chad. Global Horizontal Irradiation varies between 5.8kWh/m²/day in the South and 6.8kWh/m²/day in the North of the country. Based on the results of an economic investment and dispatch model for N'Djamena power system, most of capacity additions in the coming years should be in the form of solar photovoltaic (PV) and storage with around 130 MW of solar PV and 160 MWh of energy storage capacity already needed by 2023.
8. **Togo:** The Government of Togo (GoT) has begun implementing the National Electrification Strategy (NES) to achieve universal energy access by 2030. The Government's ambition is to raise the access rate to 75 percent by 2025 through both on-grid and off-grid schemes. Demand for electricity, estimated at 1,528 GWh in 2021, is expected to grow at 8% per year (20-25 MW/year) and reach 3,440 GWh in 2025. Togo's power



sector is primarily government controlled, with some private sector participation in generation. The Ministry of Mines and Energy (MME) is responsible for electricity sector strategy and planning, whereas the Compagnie Energie Electrique du Togo (Public Distribution Utility – CEET) is the government utility responsible for transmission and distribution of electricity within the country. In 2016, the Togolese Agency for Rural Electrification and Renewable Energy (AT2ER) was created and entrusted with the mission to program and develop rural electrification projects, to promote the use of renewable energies, to seek and mobilize financing and to participate in technical support with operators in the sector. The GoT is also increasing the share of renewable energy in the generation mix through a series of solar PV projects and hydropower. The Government adopted the Generation Transport Distribution Master Plan (PDMC). The PDMC includes an ambitious target of 50 percent renewable energy generation by 2025 and an objective of reducing imports to 30 percent by 2025. Additionally, the PDMC calls for approximately 300 MW in solar capacity additions in 2023 and an additional 60 MW in 2024 (including the Dapaong site). At the same time, the security situation in the Savanes region has prompted the government to focus on service delivery there, including increasing access to power.

C. Proposed Development Objective(s)

Development Objective(s) (From PAD)

- 9. The project development objective is to rapidly increase grid-connected renewable energy capacity and strengthen regional integration in the participating countries.**

Key Results

10. The progress towards achieving the PDO will be measured by the following indicators:

- (a) Renewable energy generation capacity (other than hydropower) constructed under the project (MW);
sub-indicator: Generation Capacity of Renewable Energy Constructed-Solar (MW) (whereby to ensure the rapid response of the Project, approximately 40 percent of the total expected volume will be deployed by the end of the year one, while an additional 10 percent will be deployed in year two, thus bringing the proportion of the constructed capacity to approximately 50 percent of the total target (or 56 MW out of 106 MW) by year two;
- (b) Generation capacity of hydropower constructed or rehabilitated under the project (MW);
- (c) Installed capacity of battery storage (MWh);
- (d) Generation capacity for regional power trade in ECOWAS (MW);
- (e) Supply of renewable energy (GWh);
- (f) Net GHG emissions (metric tons/year);
- (g) WAPP Priority projects brought to the point where investment-grade feasibility studies and associated documentation have been completed;
- (h) Ratio of annual total hours of synchronization of WAPP areas 1, 2 and 3 against total hours in a year.

D. Project Description



11. The project will support (i) the installation of solar and hydropower generation and battery storage capacity with near-term (about 3-year) O&M contracts for the provision of solar supply; (ii) necessary grid connection infrastructure; (iii) grid modernization and upgrades to ensure effective penetration of variable solar generation and (iv) capacity building among the implementing agencies and technical assistance for greater regional integration.

(i) **Component 1: Construction of Solar PV with Battery energy storage systems (BESS) and Grid Connection (USD 184 million equivalent IDA)** will finance all costs associated with the Design, Supply and Installation (DSI) of solar PV (106MW) and BESS, O&M for the first three years of plant operation, and any associated works for grid connection.

(ii) **Component 2: Expansion of Mt. Coffee Hydro Power Plant and Dam Safety Enhancement (USD 61 million equivalent IDA)** will finance all costs associated with expansion of the Mt. Coffee Hydro Power plant by installing two new turbines with total installed capacity of 41MW. This component will also finance the implementation of the dam safety management program and develop a mechanism to mobilize required financing for long term implementation of the dam safety program.

(iii) **Component 3: Transmission and Distribution Upgrades (USD 15.5 Million Equivalent IDA)** will finance the upgrade of distribution and transmission networks to help the newly installed capacity to be connected to regional interconnectors and/or reach national populations. Specifically, this component will finance in Sierra Leone the supply and installation of voltage regulation equipment at 161/11kV Substation of Freetown to increase the evacuation capacity of the 161kV transmission line and Supply and installation of 33 kV and 11 kV distribution lines to optimize the integration of the Newton Solar Park (US\$6 million). (ASIDE: The Bumbuna Hydro Plant is connected to the 161kV line approximately 300km from Newtown; therefore, there are no adverse impact expected on the solar PV and battery storage plant at Newton in case of any emergency at Bumbuna.) The component will also finance in Togo the extension and densification of distribution grid in northern Togo with climate resilient grid infrastructure (US\$9.5 million).

(iv) **Component 4: Regional coordination, Institutional Strengthening, Implementation Support, and Technical Assistance (USD50.5 million equivalent IDA)** will finance the establishment and operation of the Regional Technical Committee (RTC) and the Regional Coordination Unit (RCU). The RCU will be responsible for overall quality assurance, coordination and reporting for the project. This component will finance any operational and technical support required by the national PIUs in the implementation of the project. The TA will build technical capacity across all PIUs as there is extremely limited capacity within PIUs on grid connected solar PV plants. The Component will also provide technical assistance for regional integration under WAPP. Lastly, the Component will finance technical assistance for establishment of river basin management agency and preparation of new hydro projects in Liberia.

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



E. Implementation

Institutional and Implementation Arrangements

- 12. Liberia Electricity Corporation (LEC), Electricity Distribution and Supply Authority (EDSA), Societe Nationale d'Electricite du Tchad (SNE) and the Togolese Agency for Rural Electrification and Renewable Energy (AT2ER) will be the implementation agencies for the project's various activities in their respective countries.** LEC, the vertically integrated electricity utility in Liberia, will be responsible for the construction and operation of the 20MWp Solar PV plant, the expansion of the MCHPP, and all grid related work associated with the project. EDSA, the distribution utility in Sierra Leone, will be responsible for implementing the project in Sierra Leone that includes the DSI and O&M for two solar PV power plants (42 MWp) with battery storage, associated grid works and the upgrading of the 161kV line in Sierra Leone. SNE, the power utility in Chad, is responsible for infrastructure work for the 35MWp solar PV plant and the associated grid works for evacuation of power from the plant. In Togo, AT2ER, the rural electrification agency is responsible for the construction of a 35MWp power plant and extension and densification of distribution grid. All works contracts under the various components will be signed by the National Governments through the PIUs.
- 13. The WAPP Secretariat will implement technical assistance activities for improved regional integration.** This is a continuation of the successful implementation arrangements for Component 2 of the WAPP-CLSG Interconnector Project (P113266), which is implemented by a WAPP team. The WAPP implementation team will coordinate with the RCU to ensure timely exchanges of knowledge and results of the studies under this TA. More broadly WAPP also will play a coordination and facilitation role to help countries work together to accelerate this type of procurement outside the scope of RESPITE.

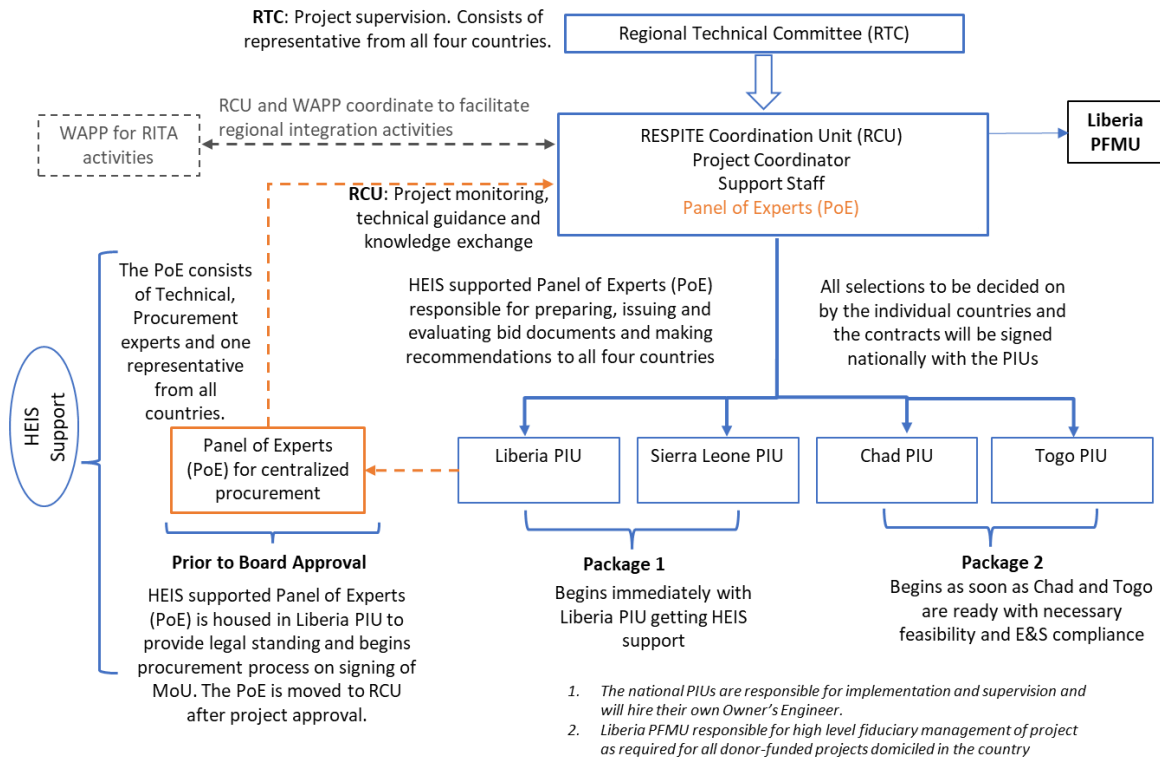


Figure 4. RESPITE Institutional Arrangement

14. **A Regional Technical Committee (RTC) will be established with representatives from each country to provide overall guidance, supervision and, where necessary, make any collective decisions during the project.** The RTC, consisting of DGs of the utilities or alternative individuals nominated by the country, will bring alignment between the countries regarding the operating and coordination modalities. Moreover, the RTC will serve as an important platform for knowledge sharing between the countries, especially since each will move at a different pace in terms of project implementation. The RTC is a consultative body that will meet quarterly to review the status of the Project, discuss progress and potential problems in the implementation of subcomponents in each country. The RTC will also provide guidance and recommendations to the Regional Coordination Unit and to the utilities in charge of implementation. The RTC will also ensure inter-agency coordination and cooperation, as well as reporting to line ministries in each country.
15. **A RESPITE Coordination Unit (RCU), for overall project coordination and to carry out procurement for the project, will be set up.** The RCU will be responsible for overall coordination of the project that includes quality assurance, monitoring and evaluation, regular reporting to World Bank, and communication with all entities, etc. The RCU will report directly to the RTC and the World Bank. One of the most important functions of the RCU will be to manage the contracts for the technical and procurement specialists in the Panel of Experts (PoE) who will be responsible for supporting the procurement of infrastructure works. The RCU will consist of a project coordinator, a procurement specialist, a financial management specialist and a support staff. The RCU will also be responsible for providing technical assistance to the national PIUs during the project. The RCU will be domiciled in Liberia to ensure timely implementation of project.



16. **The role of the Panel of Experts (PoE) is critical to rapid project implementation.** The PoE will consist of an international procurement expert who will also head the PoE, at least two international experts (one for solar and one for transmission and distribution) and one support staff. Each country will also nominate at least 1 senior procurement specialist and up to two other technical experts for participating in the procurement process. The PoE will be responsible for preparing bid documents, initiating the bid process, carrying out the evaluations and making recommendations to the relevant PIUs for contracting the infrastructure works in their countries. The governments – through their National PIUs (LEC, EDSA, SNE and AT2ER) - will be solely responsible for making the final decision and signing the relevant contracts for the works. The PoE will provide additional support – both procurement and technical – if deemed necessary by the relevant country.
17. **The procurement for works will be carried out through a centralized approach that will provide flexibility to each country in moving at its preferred own pace and yet help the project move forward quickly.** The countries have agreed to the procurement and implementation arrangements and signing an MOU before the Project is approved by the WB Board. Once the MoU is signed, the PoE will be selected and commence procurement activities. Additionally, the national implementing agency will be responsible for hiring the supervision engineer for construction supervision and quality assurance.

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APPROVAL

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