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Report No: PAD5145

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT
ON A

PROPOSED GRANT IN THE AMOUNT OF SDR 46.8 MILLION
(US$60.0 MILLION EQUIVALENT)
TO THE REPUBLIC OF CHAD

PROPOSED CREDIT IN THE AMOUNT OF US$96.0 MILLION
TO THE REPUBLIC OF LIBERIA

PROPOSED GRANT IN THE AMOUNT OF SDR 58.5 MILLION
(US$75.0 MILLION EQUIVALENT)
TO THE REPUBLIC OF SIERRA LEONE

PROPOSED CREDIT IN THE AMOUNT OF EUR 60.5 MILLION
(US$60.0 MILLION EQUIVALENT)
TO THE TOGOLESE REPUBLIC

AND A

PROPOSED GRANT IN THE AMOUNT OF SDR 15.6 MILLION
(US$20.0 MILLION EQUIVALENT)
TO THE WEST AFRICAN POWER POOL (WAPP)

FOR A

REGIONAL EMERGENCY SOLAR POWER INTERVENTION PROJECT

December 7, 2022

Energy and Extractives Global Practice
Western and Central Africa Region

CURRENCY EQUIVALENTS

Exchange Rate Effective October 31, 2022

Currency Unit =	Special Drawing Rights (SDR); Euro (EUR); Central African CFA franc (XAF); Liberian Dollar (LRD); Sierra Leonean Leone (SLL); West African CFA franc (XOF)
US$1 =	SDR 0.77924709
US$1 =	EUR 1.00674519
US$1 =	XAF 660.3798
US$1 =	LRD 153.14991
US$1 =	SLL 17.599437
US$1 =	XOF 660.37985

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank
ASSL	Audit Service Sierra Leone
AT2ER	Togolese Agency for Rural Electrification and Renewable Energy
AWPB	Annual Work Plan and Budget
BD	Bidding Document
BESS	Battery Energy Storage System
BMP	Biodiversity Management Plan
BOAD	West African Development Bank (*Banque Ouest Africaine de Développement*)
CE	Citizen Engagement
CEB	Electricity Community of Benin (*Communauté Electrique du Benin*)
CEET	Electric Power Company of Togo (*Compagnie Energie Electrique du Togo*)
CEN	Country Engagement Note
CLSG	Côte d'Ivoire, Liberia, Sierra Leone, and Guinea
CoC	Code of Conduct
COVID	Corona Virus Disease
CPF	Country Partnership Framework
DA	Designated Account
DFIL	Disbursement and Financial Information Letter
DG	Director General
DPF	Development Policy Financing
DSI	Design Supply and Installation
E&S	Environment and Social
ECOWAS	Economic Community of West African States
ECREE	ECOWAS Centre for Renewable Energy and Energy Efficiency
EDSA	Electricity Distribution and Supply Authority
EGTC	Electricity Generation and Transmission Company of Sierra Leone
EHSG	Environment, Health, and Safety Guideline
EIRR	Economic Internal Rate of Return
EPP	Emergency Preparedness Plan
ERERA	ECOWAS Regional Electricity Regulatory Authority
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESRS	Environment and Social Review Summary
ESS	Environment Social Standards
FA	Financing Agreement
FCV	Fragile, Conflict, Violent
FIRR	Financial Internal Rate of Return
FM	Financial Management
FNPV	Financial Net Present Value

GAC	General Audit Commission
GBM	Ghana Burkina Mali
GCRF	Global Crisis Response Framework
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GHI	Global Horizontal Irradiation
GIZ	German Society for International Cooperation GmbH (*Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH*)
GM	Grievance Mechanism
GoSL	Government of Sierra Leone
GPN	General Procurement Notice
GRIDCO	Grid Company of Ghana
GRS	Grievance Redress Service
GW	Gigawatts
HEIS	Hands-on Enhanced Implementation Support
HFO	Heavy Fuel Oil
HPP	Hydropower Plant
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IDEA	Togo Increased Digital Connectivity and Electricity Access
IFC	International Finance Corporation
IFMIS	Integrated Financial Management Information System
IFR	Interim Financial Reports
INDC	Intended Nationally Determined Contributions
IPF	Investment Project Financing
IPP	Independent Power Producer
ISR	Implementation Status and Results Report
km	Kilometer
KP	Karpowership
kV	Kilo Volt
kWh	Kilowatt hour
LEC	Liberia Electricity Corporation
LESSAP	Liberia Electricity Strengthening and Access Project
LESEP	Liberia Electricity System Enhancement Project
LMP	Labor Management Procedures
LRP	Livelihood Restoration Plan
M&E	Monitoring and Evaluation
MCHPP	Mount Coffee Hydropower Plant
MFD	Maximizing Finance for Development
MoU	Memorandum of Understanding
MTCO2e	Metric tons CO2 equivalent
MTNDP	Medium-Term National Development Plan of Sierra Leone
MW	Megawatt

MWac	Megawatt, Alternating Current
MWp	Megawatt peak
NDP	National Development Plan
NGO	Non-Governmental Organization
NPV	Net Present Value
NREL	National Renewable Energy Lab
O&M	Operation and Maintenance
OECD	Organization for Economic Cooperation and Development
PAD	Project Appraisal Document
PAPD	Pro-Poor Agenda for Prosperity and Development
PD	Procurement Division
PDMC	Generation Transport Distribution Master Plan of Togo (*Plan Développement Moindre Coût*)
PDO	Project Development Objective
PFM	Project Financial Management
PFMU	Project Financial Management Unit
PIM	Project Implementation Manual
PIU	Project Implementation Unit
PMC	Procurement Management Consultant
PoE	Panel of Experts
PPA	Power Purchase Agreement
PPR	Procurement Post Reviews
PPSD	Project Procurement Strategy for Development
PRISET	Togo Energy Sector Support and Investment Project (*Projet de Réforme et d'investissement dans le secteur de l'énergie au Togo*)
PURS	Resilience-Building Program in the Savanes Region
PV	Photovoltaic
RAP	Resettlement Action Plan
RCU	RESPITE Coordination Unit
RESPITE	Regional Emergency Solar Power Intervention
RFP	Request for Proposal
RITA	Regional Integration and Technical Assistance
ROM	RESPITE Operation Manual
RTC	Regional Technical Committee
SCADA	Supervisory Control and Data Acquisition
SDR	Special Drawing Rights
SEA/SH	Sexual Exploitation and Abuse/Sexual Harassment
SEP	Stakeholder Engagement Plan
SLA	Service Level Agreement
SLL	Sierra Leonean Leon
SNE	National Electricity Company – Chad (*Societe Nationale d'Electricite du Tchad*)
SPD	Standard Procurement Document
STEP	Systematic Tracking of Exchanges in Procurement

SVC	Static VAR compensator
T&D	Transmission and Distribution
TA	Technical Assistance
TCN	Transmission Company of Nigeria
ToRs	Terms of References
TRANSCO CLSG	Transmission Company Côte d'Ivoire, Liberia, Sierra Leone, and Guinea
TSA	Transmission Service Agreement
US$	United States Dollar
USc or US¢	Unites States cents
VA	VoltAmpere
WAPP	West African Power Pool
WBG	World Bank Group
WTP	Willingness to Pay

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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name
Western and Central Africa, Liberia, Sierra Leone, Chad, Togo	Regional Emergency Solar Power Intervention Project

Project ID	Financing Instrument	Environmental and Social Risk Classification	Process
P179267	Investment Project Financing	High	Urgent Need or Capacity Constraints (FCC)

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[ ] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[✓] Fragile State(s)
[ ] Performance-Based Conditions (PBCs)	[ ] Small State(s)
[ ] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[✓] Responding to Natural or Man-made Disaster
[ ] Alternate Procurement Arrangements (APA)	[✓] Hands-on Enhanced Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
20-Dec-2022	30-Jun-2027
Bank/IFC Collaboration	Joint Level
Yes	Complementary or Interdependent project requiring active coordination

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 Name	Cost (US$, millions)
Component 1: Construction of Solar PV, BESS and Grid Connections	184.00
Component 2: Expansion of Mt. Coffee Hydro Power Plant and Dam Safety Enhancement	61.00
Component 3: Distribution Expansion and Transmission Optimization	15.50
Component 4: Regional Coordination, Institutional Strengthening, and Implementation Support	50.50

Organizations

Borrower:	Republic of Chad Republic of Liberia Republic of Sierra Leone Togolese Republic West African Power Pool
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

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

IDA Resources (in US$, Millions)

	Credit Amount	Grant Amount	SML Amount	Guarantee Amount	Total Amount
Liberia	96.00	0.00	0.00	0.00	96.00
National Performance-Based Allocations (PBA)	32.00	0.00	0.00	0.00	32.00
Regional	64.00	0.00	0.00	0.00	64.00
Sierra Leone	0.00	75.00	0.00	0.00	75.00
National Performance-Based Allocations (PBA)	0.00	25.00	0.00	0.00	25.00
Regional	0.00	50.00	0.00	0.00	50.00
Chad	0.00	60.00	0.00	0.00	60.00
National Performance-Based Allocations (PBA)	0.00	20.00	0.00	0.00	20.00
Regional	0.00	40.00	0.00	0.00	40.00
Togo	60.00	0.00	0.00	0.00	60.00
National Performance-Based Allocations (PBA)	20.00	0.00	0.00	0.00	20.00
Regional	40.00	0.00	0.00	0.00	40.00
Western and Central Africa	0.00	20.00	0.00	0.00	20.00
Regional	0.00	20.00	0.00	0.00	20.00
Total	**156.00**	**155.00**	**0.00**	**0.00**	**311.00**

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2023	2024	2025	2026	2027	2028
Annual	19.40	169.45	57.95	42.70	21.00	0.50
Cumulative	19.40	188.85	246.80	289.50	310.50	311.00

INSTITUTIONAL DATA

Practice Area (Lead)

Energy & Extractives

Contributing Practice Areas

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	High
2. Macroeconomic	Substantial
3. Sector Strategies and Policies	Substantial
4. Technical Design of Project or Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	High
6. Fiduciary	Substantial
7. Environment and Social	High
8. Stakeholders	Substantial
9. Other	
10. Overall	Substantial

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance
Assessment and Management of Environmental and Social Risks and Impacts	Relevant
Stakeholder Engagement and Information Disclosure	Relevant
Labor and Working Conditions	Relevant
Resource Efficiency and Pollution Prevention and Management	Relevant
Community Health and Safety	Relevant
Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Not Currently Relevant
Cultural Heritage	Relevant
Financial Intermediaries	Not Currently Relevant

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

Legal Covenants

Sections and Description
FA with Chad (Schedule 2, Section IV, A): No later than sixty (60) days from the Effective Date, the Recipient will prepare and adopt the RESPITE Operation Manual ("ROM"), in form and substance satisfactory to the Association.

Sections and Description
FA with Chad (Schedule 2, Section IV, B): No later than sixty (60) days from the Effective Date, the Recipient will update and adopt the SNE Project Implementation Manual ("SNE PIM"), in form and substance satisfactory to the Association.

Sections and Description
FA with Chad (Schedule 2, Section IV, C): No later than thirty (30) days from the Effective Date, the Recipient, will submit the Project Procurement Strategy for Development (PPSD) for Chad to the Association for its review and approval.

Sections and Description
FA with Chad (Schedule 2, Section IV, D): No later than three (3) months from the Effective Date, the SNE PIU will (i) customize its accounting software; (ii) appoint one additional senior accountant with qualification, experience and terms of references satisfactory to the Association, and (iii) update the terms of reference of the internal auditor to include the RESPITE.

Sections and Description
FA with Chad (Schedule 2, Section IV, E): No later than six (6) months from the Effective Date, the Recipient, through SNE PIU, will recruit external auditors for Parts I.C and IV.C of the Project, with qualifications and terms of reference satisfactory to the Association.

Sections and Description
FA with Chad (Schedule 2, Section IV, F): No later than six (6) months from the Effective Date, the Recipient, through SNE PIU, will recruit a consulting firm with qualifications and experience and under terms of reference satisfactory to the Association, in order to perform the functions of the supervision engineer (the “Chad Supervision Engineer”) and assist the SNE PIU with the implementation of Part I.C of the Project, including: (i) providing guidance and recommendations to the SNE PIU on technical and policy matters in relation to the Project Implementation Entity Respective Activities; (ii) preparing bidding documents and subsequent changes/variations thereof; (iii) supporting the SNE PIU in evaluating technical and financial proposals; (iv) supporting the SNE PIU in supervising and certifying contractors’ performance/delivery of contract obligations, including carrying out site and documentary inspections, and performing quality controls tests; (v) handling contractual matters and procurement disputes; (vi) certifying payment appropriation for invoices from service providers and/or Project contractors; (vii) providing training, guidance and recommendations to the SNE PIU, and instructions to contractors, to ensure the Project’s compliance with the ESSs, the ESCP, and any safeguard documents prepared thereunder; and (viii) preparing the Project Reports.

Sections and Description
FA with Chad (Schedule 2, Section IV, I): No later than twelve months before the expiration of the contra mentioned in paragraph H, the Recipient will launch consultations to define the modalities of the operation and maintenance of the assets financed under Part I.C of the Project, upon termination of the O&M contract mentioned above, so as to ensure the proper and continued provision of electricity.

Sections and Description
ESCP for Chad: The existing PIU shall appoint one (1) environmental specialist, one (1) social specialist, and 1 SEA/SH specialist from the current PIU who will be in place within 30 days of Effective Date. In addition, the PIU shall hire additional one (1) international OHS and one (1) GBV specialist not later than 60 days after the Effective Date.

Sections and Description
ESCP for Chad: The Grievance Mechanism that is prepared for the SEP (that shall integrate resettlement issues) shall be operational prior to commencement of resettlement activities and shall be operational not later than 90 days after Effective Date

Sections and Description
ESCP for Chad: The LMP shall be prepared, disclosed, consulted upon and adopted not later than 60 days after the Effective Date and before any start of activities, and thereafter implement the LMP throughout Project implementation.

Sections and Description
ESCP for Chad: Grievance mechanism for project workers shall be operational prior to engaging Project workers and maintained throughout Project implementation.

Sections and Description
ESCP for Chad: Update the SEP not later than 60 days after Project Effective Date.

Sections and Description
ESCP for Chad: Establish the grievance mechanism not later than 90 days after the Effective Date and prior to the start of project activities.

Sections and Description
FA with Liberia (Schedule 2, Section I, D.7): No later than two (2) years from the Effective Date, the Recipient will have operationalized the EPP for MCHPP, in a manner satisfactory to the Association.

Sections and Description
FA with Liberia (Schedule 2, Section IV, A): No later than sixty (60) days from the Effective Date, RCU will recruit a procurement specialist, a financial management officer, a social specialist, an environmental specialist, and a gender-based violence consultantand support staff, all with experience, qualifications and terms of reference satisfactory to the Association.

Sections and Description
FA with Liberia (Schedule 2, Section IV, B): No later than sixty (60) days from the Effective Date, the Recipient will prepare and adopt the ROM, in form and substance satisfactory to the Association.

Sections and Description
FA with Liberia (Schedule 2, Section IV, C): No later than sixty (60) days from the Effective Date, the Recipient will update and adopt LEC PIM, in form and substance satisfactory to the Association.

Sections and Description
FA with Liberia (Schedule 2, Section IV, D): No later than thirty (30) days from the Effective Date, the Recipient will submit the Project Procurement Strategy for Development (PPSD) for Liberia to the Association for its review and approval.

Sections and Description
FA with Liberia (Schedule 2, Section IV, E): No later than two (2) months from the Effective Date, the PFMU will customize the existing accounting software to include the account of RESPITE to generate the IFRs and financial statement.

Sections and Description

FA with Liberia (Schedule 2, Section IV, F): No later than six (6) months from the Effective Date, the Recipient, through LEC PIU, will recruit external auditors for Parts I.A, II and IV.B to D of the Project, with qualifications and terms of reference satisfactory to the Association.

Sections and Description

FA with Liberia (Schedule 2, Section IV, G): No later than (a) six months from the Effective Date, the Recipient, through LEC PIU, will recruit a consulting firm with qualifications and experience and under terms of reference satisfactory to the Association, in order to perform the functions of the supervision engineer and assist the LEC PIU with the implementation of Part I.A of the Project, and (b) twelve (12) months from the Effective Date, the Recipient, through LEC PIU, will recruit a consulting firm with qualifications and experience and under terms of reference satisfactory to the Association, in order to perform the functions of the supervision engineer and assist the LEC PIU with the implementation of the Part II of the Project, (collectively the "Liberia Supervision Engineers"), including: (i) providing guidance and recommendations to the LEC PIU on technical and policy matters in relation to the Project Implementation Entity Respective Activities; (ii) preparing bidding documents and subsequent changes/variations thereof; (iii) supporting the LEC PIU in evaluating technical and financial proposals; (iv) supporting the LEC PIU in supervising and certifying contractors' performance/delivery of contract obligations, including carrying out site and documentary inspections, and performing quality controls tests; (v) handling contractual matters and procurement disputes; (vi) certifying payment appropriation for invoices from service providers and/or Project contractors; (vii) providing training, guidance and recommendations to the LEC PIU, and instructions to contractors, to ensure the Project's compliance with the ESSs, the ESCP, and any safeguard documents prepared thereunder; and (viii) preparing the Project Reports.

Sections and Description

FA with Liberia (Schedule 2, Section IV, J): No later than 12 months prior to the expiration of the contract referred to in paragraph I, the Recipient will launch consultations to define the modalities of the operation and maintenance of the assets financed under Parts I.A of the Project, upon termination of the O&M contract mentioned above, so as to ensure continued provision of electricity.

Sections and Description

ESCP for Liberia: Labor Management Procedures shall be jointly prepared by the PIU and RCU not later than 30 days of the Effective Date and submitted to the Association for approval, disclosed, and adopted before recruitment of Project workers, and thereafter implemented throughout Project implementation.

Sections and Description

ESCP for Liberia: Establish and maintain a PIU consisting of an environmental and social specialist as set out in the Financing Agreement not later than 30 days after the Effective Date. Recruit a biodiversity consultant, a social consultant with experience in resettlement, and a GBV specialist not later than 60 days after the Effective Date, and thereafter retain said staff throughout Project implementation.

Sections and Description

ESCP for Liberia: The PIU and RCU shall update and redisclose the SEP not later than 60 days of Project Effective Date.

Sections and Description
ESCP for Liberia: Project workers' grievance mechanism shall be established and operational prior to engaging Project workers and thereafter maintained and operated throughout Project implementation and shall be accessible to all project workers.

Sections and Description
ESCP for Liberia: Prepare, disclose, consult upon and adopt a (i) preliminary EPP not later than six (6) months after the Effective Date, and (ii) a finalized Emergency Preparedness Plan for Mt. Coffee in line with the requirements under section 1.4, prior to initiation of project activities and prior to disbursement under activities under Component 2A.

Sections and Description
ESCP for Liberia: Establish and maintain a RCU as set out in the Financing Agreement not later than the Effective Date. Recruit the environmental specialist, social specialist and GBV consultant not later than 60 days after the Effective Date, and thereafter retain said staff throughout Project implementation.

Sections and Description
ESCP for Liberia: The Grievance Mechanism shall be operational prior to commencement of resettlement activities and shall be operational no later than 60 days after Effective Date.

Sections and Description
ESCP for Liberia: Prepare, disclose, consult upon, and adopt a Biodiversity Management Plan (BMP) prior to disbursement for both Mt Coffee HPP and solar PV, and thereafter implement the BMP throughout Project implementation.

Sections and Description
ESCP for Liberia: The PIU and RCU shall establish the preliminary grievance mechanism no later than 30 days after Effective Date, update this preliminary GM to adequately cover all grievance procedures not later than 90 days after Effective Date, and thereafter maintain and operate the mechanism throughout Project implementation.

Sections and Description
FA with Sierra Leone (Schedule 2, Section IV, A): No later than sixty (60) days from the Effective Date, the Recipient will prepare and adopt the RESPITE Operation Manual ("ROM"), in form and substance satisfactory to the Association.

Sections and Description
FA with Sierra Leone (Schedule 2, Section IV, B): No later than sixty (60) days from the Effective Date, the Recipient will update and adopt the EDSA Project Implementation Manual ("EDSA PIM"), in form and substance satisfactory to the Association.

Sections and Description
FA with Sierra Leone (Schedule 2, Section IV, C): No later than thirty (30) days from the Effective Date, the Recipient will submit the Project Procurement Strategy for Development (PPSD) for Sierra Leone to the Association for its

review and approval.

Sections and Description

FA with Sierra Leone (Schedule 2, Section IV, D): No later than thirty (30) days from the Effective Date, the Recipient, through EDSA PIU, will hire a procurement specialist, with qualifications, experience and terms of reference satisfactory to the Association.

Sections and Description

FA with Sierra Leone (Schedule 2, Section IV, E): No later than six months from the Effective Date, the Recipient, through EDSA PIU, will recruit external auditors for Parts I.B, III.A and IV.C of the Project, with qualifications and terms of reference satisfactory to the Association.

Sections and Description

FA with Sierra Leone (Schedule 2, Section IV, F): No later than six (6) months from the Effective Date, the Recipient, through EDSA PIU, will recruit a consulting firm with qualifications and experience and under terms of reference satisfactory to the Association, in order to perform the functions of the supervision engineer (the "Sierra Leone Supervision Engineer") and assist the Recipient and EDSA PIU with the implementation of Parts I.B and III.A of the Project, including: (i) providing guidance and recommendations on technical and policy matters in relation to the Project Implementation Entity Respective Activities; (ii) preparing bidding documents and subsequent changes/variations thereof; (iii) supporting in evaluating technical and financial proposals; (iv) support in supervising and certifying contractors' performance/delivery of contract obligations, including carrying out site and documentary inspections, and performing quality controls tests; (v) handling contractual matters and procurement disputes; (vi) certifying payment appropriation for invoices from service providers and/or Project contractors; (vii) providing training, guidance and recommendations to the Recipient, the EDSA PIU, and instructions to contractors, to ensure the Project's compliance with the ESSs, the ESCP, and any safeguard documents prepared thereunder; and (viii) preparing the Project Reports.

Sections and Description

FA with Sierra Leone (Schedule 2, Section IV, I): No later than twelve (12) months prior to the expiration of the O&M contract mentioned in paragraph H, the Recipient will launch consultations to define the modalities of the operation and maintenance of the assets financed under Parts I.B and III.A of the Project, upon termination of the O&M contract mentioned above, so as to ensure the proper and continued provision of electricity.

Sections and Description

ESCP for Sierra Leone: Establish and maintain a PIU as set out in the Financing Agreement. Appoint the Environmental Specialist, Social Specialist and Citizen Engagement Specialist, not later than 30 days after Effective Date and hire the environmental/OHS consultant, GBV specialist and social consultant within 60 days after Effective Date, and thereafter maintain these positions throughout Project implementation.

Sections and Description

ESCP for Sierra Leone: The Grievance Mechanism shall be operational prior to commencement of resettlement activities and shall be operational not later than 60 days after Effective Date.

Sections and Description

ESCP for Sierra Leone: Update the SEP and redisclose it within 60 days of the Effective Date.

Sections and Description
ESCP for Sierra Leone: Establish and operationalize the grievance mechanism within 60 days of Project Effective Date and thereafter maintain and operate the mechanism throughout Project implementation.

Sections and Description
ESCP for Sierra Leone: Grievance mechanism to be operational prior to recruitment of workers and implemented throughout Project implementation.

Sections and Description
FA with Togo (Schedule 2, Section IV, A): No later than sixty (60) days from the Effective Date, the Recipient will prepare and adopt the ROM, in form and substance satisfactory to the Association.

Sections and Description
FA with Togo (Schedule 2, Section IV, B): No later than sixty (60) days from the Effective Date, the Recipient will update and adopt the AT2ER PIM, in form and substance satisfactory to the Association.

Sections and Description
FA with Togo (Schedule 2, Section IV, C): No later than thirty (30) from the Effective Date, the Recipient will submit the Project Procurement Strategy for Development (PPSD) for Togo to the Association for its review and approval.

Sections and Description
FA with Togo (Schedule 2, Section IV, D): No later than ninety (90) days from the Effective Date, the Recipient will (i) update the financial management manual of procedures used under African Development Bank financed projects managed by AT2ER, (ii) recruit or appoint financial management officers and accountants, in numbers, with qualifications and terms of reference satisfactory to the Association; (iii) include in the work plan of the current internal auditor the activities of the Project; (iv) customize the existing Tom2Pro accounting software to include the accounts of the Project to generate the IFRs and financial statement; and (v) assign the current procurement specialist of PRISET to the AT2ER PIU or recruit another qualified procurement specialist.

Sections and Description
FA with Togo (Schedule 2, Section IV, E): No later than six (6) months from the Effective Date, the Recipient, through AT2ER PIU, will recruit external auditors for Parts I.D, III.B and IV.C of the Project, with qualifications and terms of reference satisfactory to the Association.

Sections and Description
FA with Togo (Schedule 2, Section IV, F): No later than nine (9) months from the Effective Date, the Recipient, through AT2ER PIU, will recruit a consulting firm with qualifications and experience and under terms of reference satisfactory to the Association, in order to perform the functions of the supervision engineer (the “Togo Supervision Engineer”) and assist the AT2ER PIU with the implementation of the Parts I.D, Part III.B and Part IV.C of the Project, including: (i) providing guidance and recommendations to the AT2ER PIU on technical and policy matters; (ii) preparing bidding documents and subsequent changes/variations thereof; (iii) supporting the AT2ER PIU in evaluating technical and financial proposals; (iv) supporting the AT2ER PIU in supervising and certifying contractors’

performance/delivery of contract obligations, including carrying out site and documentary inspections, and performing quality controls tests; (v) handling contractual matters and procurement disputes; (vi) certifying payment appropriation for invoices from service providers and/or Project contractors; (vii) providing training, guidance and recommendations to the AT2ER PIU, and instructions to contractors, to ensure the Project's compliance with the ESSs, the ESCP, and any safeguard documents prepared thereunder; and (viii) preparing the Project Reports.

Sections and Description

FA with Togo (Schedule 2, Section IV, I): No later than three (3) months before expiration of the O&M contract mentioned in paragraph H, the Recipient will confirm the modalities of the operation and maintenance of the assets financed under Parts I.D and III.B of the Project, upon termination of the O&M contract mentioned above, so as to ensure the proper and continued provision of electricity.

Sections and Description

ESCP for Togo: The LMP shall be prepared and disclosed not later than 60 days after the Effective Date and before any start of activities.

Sections and Description

ESCP for Togo: In line with TORs cleared by the Association, prepare, disclose, consult upon, adopt and implement an ESMF and an RPF for all foreseen sub-projects related to distribution not later than 90 days after the Effective Date and before disbursement on the distribution component.

Sections and Description

ESCP for Togo: The Grievance Mechanism shall be harmonized with the SEP and shall be operational prior to commencement of resettlement activities and shall be operational not later than 90 days after Effective Date.

Sections and Description

ESCP for Togo: Finalize, adopt and redisclose the LMP not later than 90 days after the Effective Date, and thereafter implement the LMP throughout Project implementation.

Sections and Description

ESCP for Togo: Consult upon, update, and redisclose the SEP not later than 90 days after the Effective Date and thereafter implement the SEP throughout Project implementation.

Sections and Description

ESCP for Togo: Grievance mechanism for project workers shall be operational prior to engaging Project workers and maintained throughout Project implementation.

Sections and Description

ESCP for Togo: Prepare, disclose, consult upon, and adopt the RPF not later than 90 days after the Effective Date and before disbursement on the distribution component, and thereafter implement the RPF throughout Project implementation.

Sections and Description

ESCP for Togo: Establish and maintain a PIU as set out in the Financing Agreement. Hire the environmental, social specialist, and GBV Consultant within 60 days of the Effective Date, and thereafter maintain these positions throughout Project implementation.

Sections and Description
FA with WAPP (Schedule 2, Section IV, A): No later than sixty (60) days from the Effective Date, the Recipient shall prepare and adopt the WAPP Project Implementation Manual, in form and substance satisfactory to the Association.

Sections and Description
FA with WAPP (Schedule 2, Section IV, B): No later than thirty (30) days from the Effective Date, the Recipient shall submit the Project Procurement Strategy for Development (PPSD) to the Association for its review and approval.

Sections and Description
FA with WAPP (Schedule 2, Section IV, C): No later than six months from the Effective Date, the Recipient shall recruit external auditors for Part IV.A of the Project, with qualifications and terms of reference satisfactory to the Association.

Sections and Description
ESCP for WAPP: Establish the grievance mechanism not later than 60 days after the Effective Date, and thereafter maintain and operate the mechanism throughout Project implementation.

Sections and Description
ESCP for WAPP: Establish the grievance mechanism prior to engaging Project workers and not later than 60 days after the Effective Date, thereafter maintain and operate it throughout Project implementation.

Sections and Description
ESCP for WAPP: Prepare, disclose, consult upon, and adopt a Simplified ESMP not later than three months after the Effective Date, and thereafter implement the ESMP throughout Project implementation.

Sections and Description
ESCP for WAPP: Establish and maintain the PIU as set out in the Financing Agreement, hire and recruit one environmental specialist, one social specialist and one GBV consultant within two months of Effective Date, and thereafter maintain these positions throughout Project implementation.

Sections and Description
ESCP for WAPP: Prepare, disclose, consult upon, and adopt the LMP prior to engaging Project workers and not later than 60 days after the Effective Date, and thereafter implement the LMP throughout Project implementation.

Sections and Description
ESCP for WAPP: Submit to the Association an updated Grievance Mechanism for approval within 30 days of Project Effective Date.

Conditions

Type	Financing source	Description
Effectiveness	IBRD/IDA	FA with Chad (Article IV, (a)): A Subsidiary Agreement, in form and substance satisfactory to the Association, has been entered into between the Recipient and the Project Implementing Entity.
Type	Financing source	Description
Effectiveness	IBRD/IDA	FA with Chad (Article IV, (b)): The Recipient has nominated its representatives within the RTC.
Type	Financing source	Description
Effectiveness	IBRD/IDA	FA with Chad (Article IV, (c)): RCU has been established in Liberia, in form and with functions, organization and staffing satisfactory to the Association, including a project coordinator; and the RCU has recruited the Panel of Experts ("PoE") with terms of reference and qualifications satisfactory to the Association.
Type	Financing source	Description
Effectiveness	IBRD/IDA	FA with Chad (Article IV, (d)): The Recipient, through SNE PIU, and the RCU have entered into the Service Agreement, in form and substance satisfactory to the Association.
Type	Financing source	Description
Effectiveness	IBRD/IDA	FA with Liberia (Article IV, (a)): A Subsidiary Agreement, in form and substance satisfactory to the Association, has been entered into between the Recipient and the Project Implementing Entity.
Type	Financing source	Description
Effectiveness	IBRD/IDA	FA with Liberia (Article IV, (b)): The Recipient has nominated its representative(s) within the RTC.
Type	Financing source	Description
Effectiveness	IBRD/IDA	FA with Liberia (Article IV, (c)): RCU has been established, in form and with functions, organization and staffing satisfactory to the Association, including a project coordinator; and the RCU has recruited the Panel of Experts with terms of reference and qualifications satisfactory to the Association.
Type	Financing source	Description
Effectiveness	IBRD/IDA	FA with Liberia (Article IV, (d)): The Recipient, through LEC PIU, and the RCU have entered into the Service Agreement, in form and substance satisfactory to the Association.
Type	Financing source	Description
Disbursement	IBRD/IDA	FA with Liberia (Schedule 2, Section III, B.1(b)): under category (1) until the ESIA for MCISP, the ESMP for MCISP, and a RAP as

		applicable, have been prepared, disclosed, consulted upon and adopted by the Recipient; and (ii) an E&S Audit, satisfactory to the Association has been completed and measures recommended therein, including a BMP, are being implemented as and to the extent required therein.
Type Effectiveness	Financing source IBRD/IDA	Description FA with Sierra Leone (Article IV, (b)): The Recipient has nominated its representative(s) within the RTC.
Type Disbursement	Financing source IBRD/IDA	Description FA with Liberia (Schedule 2, Section III, B.1(c)): under category (2) until the ESIA for MCHPP, the ESMP for MCHPP, and a RAP as applicable, have been prepared, disclosed, consulted upon and adopted by the Recipient; and (ii) an E&S Audit, satisfactory to the Association, has been completed and measures recommended therein, including a BMP, are being implemented as and to the extent required therein; and (iii) the EPP, satisfactory to the Association, has been finalized in form and substance satisfactory to the Association.
Type Effectiveness	Financing source IBRD/IDA	Description FA with Sierra Leone (Article IV, (a)): A Subsidiary Agreement, in form and substance satisfactory to the Association, has been entered into between the Recipient and the Project Implementing Entity.
Type Effectiveness	Financing source IBRD/IDA	Description FA with Sierra Leone (Article IV, (c)): RCU has been established in Liberia, in form and with functions, organization and staffing satisfactory to the Association, including a project coordinator; and the RCU has recruited the PoE with terms of reference and qualifications satisfactory to the Association.
Type Effectiveness	Financing source IBRD/IDA	Description FA with Togo (Article IV, (c)): The Recipient, through AT2ER PIU, and the RCU have entered into the Service Agreement, in form and substance satisfactory to the Association.
Type Effectiveness	Financing source IBRD/IDA	Description FA with Sierra Leone (Article IV, (d)): The Recipient, through the Project Implementing Entity, and the RCU have entered into the Service Agreement, in form and substance satisfactory to the Association.

Type	Financing source	Description
Effectiveness	IBRD/IDA	FA with Togo (Article IV, (a)): The Recipient has designated its representatives within the RTC.
Type	Financing source	Description
Effectiveness	IBRD/IDA	FA with Togo (Article IV, (b)): RCU has been established in Liberia, in form and with functions, organization and staffing satisfactory to the Association, including a Project coordinator; and the RCU has recruited the Panel of Experts with terms of reference and qualifications satisfactory to the Association.
Type	Financing source	Description
Disbursement	IBRD/IDA	FA with Togo (Schedule 2, Section III, B.1(b)): under Category (2) until the following measures, outlined in the ESCP, have been completed, in form and substance satisfactory to the Association: (i) an ESMF has been prepared, disclosed, consulted upon and adopted by the Recipient, (ii) an RPF been prepared, disclosed, consulted upon and adopted by the Recipient.

I. STRATEGIC CONTEXT

A. Introduction

1. **The West and Central Africa sub-region has some of the lowest country level 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, 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 limited fiscal space to support the rising sector arrears, countries are staring at an acute power supply crisis that threatens economic growth.

2. **Chad, Liberia and Sierra Leone are facing a severe power supply crisis that is contributing to fiscal instability while Togo wants to increase supply of electricity in the Northern region to address security challenges**. Liberia, Sierra Leone, and Chad are facing significant electricity purchase bills due to the rising oil prices and the high share of liquid fuel generation in their energy mix. The three countries are facing between 0.5-1 percent of Gross Domestic Product (GDP) in increased fuel purchase costs creating a fiscal crisis. Civil strife in Sierra Leone has already resulted in the loss of lives and widespread outages in Liberia have heightened tensions. 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.

3. **The proposed Regional Emergency Solar Power Intervention (RESPITE) Project will form part of the World Bank Group (WBG) response to the energy crisis facing the region.** Instead of offering support to fuel purchases, as was done in the past, the WBG will support countries to move away from heavy fuel oil (HFO) and diesel power generation by scaling up renewable power generation and improving capacity for energy trade in the future. The World 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 (TA) to further facilitate regional energy trade.

4. **The World Bank is offering a coordinated International Finance Corporation (IFC)-World Bank solution to the clients**. The proposed operation is complemented by the IFC supported "Release" program[1] that supports the deployment of containerized solar in the region, through the International Development Association (IDA) Private Sector Window liquidity support facility. The two projects together will help accelerate - on an emergency basis - the deployment of more renewable energy in the region through direct contracting with the private sector under Release and competitively sourced public procurement under RESPITE. The World Bank and IFC are coordinating the sequencing of the two interventions, depending on the readiness of each country. It is expected that for any future private investment,

[1] A debt package of up to US$100 million to Release Utilities Africa Holding B.V. ("Release"), a 100 percent owned subsidiary of Scatec ASA. The debt financing will allow the deployment of an innovative business for modular, redeployable solar and battery storage systems under a flexible leasing model, targeting public utilities in IDA/Fragile and Conflict-Affected Situation countries in Sub-Saharan Africa, with an initial rollout in Cameroon, Chad, and Liberia.

competitive selection will be the primary approach for further scale-up of renewable power generation, taking advantage of price discovery and knowledge of having procured and commissioned solar energy through these projects.

5. **RESPITE supports the energy transition and, at the same time, reduces the fiscal impact of high oil prices in the region by scaling up renewable generation**. This proposed stand-alone regional Investment Project Financing (IPF) will finance the procurement and installation of approximately 106 MW (132 MWp) of solar Photovoltaic (PV) and additional battery storage capacity across four countries in West and Central Africa (Liberia, Sierra Leone, Chad and Togo), and 41 MW of hydro capacity in Liberia. It is expected that the proposed project will (i) reduce the impact of the high oil prices and hence provide fiscal space for those countries to address the food crisis also resulting from the war in Ukraine; (ii) increase the supply of affordable and clean energy on the grid to alleviate the current power supply crisis; and (iii) help countries to move away from expensive and polluting HFO and diesel generation, thereby reducing Greenhouse Gas (GHG) emissions.

6. **RESPITE is expected to reduce GHG emissions by close to 10MtCO2eq, save 0.2 percent of GDP on average in subsidies per annum, and significantly reduce the cost of incremental generation for each of the countries**. The summary table below quantifies the significant benefits from the project in terms of expected net GHG emissions, avoided average annual subsidy to the national utilities and a significant reduction in generation costs for the energy supplied by the project compared to the current costs of thermal generation of between 23 to 29 USc/kWh.

Table 1. Summary of selected benefits of the project and average generation costs[2]

Country	**Net impact on GHG emissions** *(MtCO2e)**	**Average avoided annual subsidy for the first 5 years of the project lifetime** *(% of annual GDP of each country)*	**Average generation costs (US¢/kWh)**	
			Current costs of thermal generation	**Cost of incremental generation supplied by the project**
Liberia	-6.3	0.4	29.4	6.0
Togo	-0.8	0.06	23.6	10.8
Sierra Leone	-1.5	0.3	22.7	10.1
Chad	-1.1	0.1	24.2	12.0
Total/ weighted average for the project	**-9.6**	**0.2**	**27.2**	**7.8**

[2] The net benefits in this table in terms of the project's impact on GHG emissions and average avoided annual subsidy were estimated assuming all the new generation made available by the project will be used to displace thermal generation (either already there or generation that could be developed to meet latent demand for grid electricity). An alternative scenario is considered later in the text, whereby the new generation is assumed to serve demand that would not be met without the project through the grid and where the project hence displaces inefficient and polluting diesel self-generation and other poor alternatives to electricity and/or meets demand that would not have been met without the project at all. Current cost of thermal generation is based on the latest information provided by the national utilities in each country. For example, for Liberia and Sierra Leone these reflect actual unit thermal generation cost for the period January to July 2022. For Togo, while the current thermal generation relies on a mix of oil-based and natural gas thermal generation, the cost of thermal generation shown in the table consider only costs of oil-based generation, as oil-based generation would be displaced first as it's relatively more expensive for Togo, largely as a result of agreed price for natural gas supplied by Nigeria, which is significantly below the current prices observed on international markets.

Source: World Bank analysis

7. **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 and Central 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 Côte d'Ivoire, Liberia, Sierra Leone, and Guinea (CLSG) interconnector available for regional trade, it will support synchronization of the West African Power Pool (WAPP) network and provide further TA 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.

8. **Combined national and regional IDA totaling US$311 million is being requested to support this operation** as summarized below.

Table 2. Summary of allocations

Country	Potential Capacity	Storage	Allocation (US$M)
Liberia	20 MWp (16 MW) Solar; 41 MW Hydro	No	96
Sierra Leone	52 MWp (40 MW) Solar	Yes	75
Chad	35 MWp (30 MW) Solar	Yes	60
Togo	25 MWp (20 MW) Solar	Yes	60
WAPP	TA	NA	20
Total	**132 MWp Solar (106 MW); 41 MW Hydro**		**311**

9. **The project has received approval to apply Paragraph 12 of Section III of the World Bank IPF Policy to process the proposed project under condensed procedures**, pursuant to the World Bank's procedure "Preparation of Investment Project Financing – Situations of Urgent Needs of Assistance or Capacity Constraints" issued on December 14, 2021. The World Bank has also received formal correspondence from all four countries requesting support for the project. Given the emergency nature of RESPITE, procurement has commenced before project appraisal with any activities reaching the contract stage contingent on the World Bank Board Approval. All countries have agreed to the implementation framework and to sign a Memorandum of Understanding (MoU) to commence procurement.

B. Regional Context

10. **West Africa[3] has low access to electricity and low consumption levels with demand expected to increase exponentially**. The latest Tracking SDG7 report states that as of 2020[4], 77 percent of the global population without access to electricity (568 million people) lives in Sub-Saharan Africa. The West and Central Africa sub-region accounts for 39 percent of this population and is home to the world's single largest access deficit

[3] Defined as the World Bank Central and West Africa Region.
[4] Tracking SDG7: The Energy Progress Report, 2022.

country (Nigeria). Only 10 of the 22 countries in the region are above the Sub-Saharan average for population with access. The annual energy consumption in the West and Central Africa region (317 kwh/per capita) is nearly half of the average energy consumption in Sub-Saharan Africa (645 kwh/per capita)[5] highlighting the disparity between West and Central Africa and the rest of Sub-Saharan Africa. Given the low access rate and the forecasted population growth in the region, demand is expected to rise exponentially, underlining the importance for the power sector to prepare for this expansion.

Making of a Crisis

11. **High dependency on oil-based generation has led to tariffs that are among the highest globally**. Many countries in the region remain heavily reliant on diesel and/or HFO and have T&D losses of above 30 percent. Consequently, they are faced with costs of supply that are more than double the average in the Organization for Economic Cooperation and Development (OECD) countries, while electricity tariffs, although high, remain below their cost reflective level. Sierra Leone and Liberia are almost entirely dependent on liquid fuel generation during the dry season (December - May), while Chad's entire N'Djamena power system is fueled by diesel and nearly half of Togo's installed capacity is run on HFO and diesel year-round. High energy costs pose an unsurmountable barrier to expanding electrification at scale and constrain competitiveness of regional firms; at the same time, the needed energy subsidies stretch the already constrained fiscal space of countries and limit their ability to attract private investment in the power sector due to the weak creditworthiness of the national utilities.

12. **Rising oil prices are impacting the countries' ability to address critical issues such as the impending food crisis and investing in other social sectors**. The Ukraine war and its impact on further increasing oil prices has left a major gap in government budgets across many countries in the region. As the war in Ukraine unfolded, global food prices rose by 84 percent year-on-year, the largest increase since 2008.[6] The IMF predicts that the rising fuel and food prices are likely to lower economic growth in Sub-Saharan Africa to 3.8 this year from 4.5 percent in 2021[7]. While addressing the rising food prices is a critical issue, the governments have been hit by the rising cost of electricity supply, putting an increased burden on the already tight fiscal situation. The costs of electricity supply have risen significantly for the region over the past few months as oil prices increased. In Sierra Leone, the average cost of HFO power from Karpowership (an Independent Power Producer [IPP]) went up from 16-18 cents/kWh range to 22 cents/kWh in March and further to 27.4 cents/kWh in June 2022. The country is looking at an additional 0.5 percent of GDP in increased fuel purchase costs for the power sector if oil prices remain at around US$100/barrel in the current calendar year.

13. **The continuous civil strife in the region driven by the inability of the countries to respond to the emergency have created an urgent need for assistance to curb man-made disaster and conflict, as envisaged by Paragraph 12 of Section III of the World Bank IPF Policy**. The impact of the Ukraine war and the rising oil prices is not just felt in government budgets but is also being seen in increased power outages. In Liberia, the 33 MW of liquid fuel plants are woefully inadequate to cover the demand resulting in significant load-shedding during the past dry season and leaving many areas with electricity supply for only

[5] Based on 2018 data from IEA.
[6] World Bank internal Note for G7.
[7] *https://blogs.imf.org/2022/04/28/africa-faces-new-shock-as-war-raises-food-and-fuel-costs/?utm_medium=email&utm_source=govdelivery*

a few hours a day. In Sierra Leone, the government had arrears of about US$30 million with IPPs as of August 2022 causing the IPPs to reduce their generation output or even at times to completely shut down operations, leading to significant blackouts in the country and fueling civil unrest that has cost human lives.

14. **The countries participating in the project are also highly vulnerable to climate change**. Overall, the sub-region contributes to less than 0.7 percent (Chad 0.1 percent, Liberia 0.2 percent, Sierra Leone 0.1 percent, Togo 0.3 percent) of the global emission, but ranks in low 15 percentile out of 188 countries on the least resilient countries[8]. The climate and disaster risk screening indicates that the region has a high risk of river and urban floods, water scarcity, extreme heat, and wildfires. An increase in the frequency and severity of extreme weather events would inflict a heavy toll in human lives and welfare, with a high risk of damage to the country's scarce and valuable human and natural capital. In addition, mean annual temperature is projected to rise by over 2°C by mid-century[9]. The poorest, marginalized and most vulnerable households and communities will be hit the hardest, as income, economic, and health shocks will drive them deeper into poverty. Infrastructure assets, including electricity T&D network, are particularly vulnerable to both chronic and acute climate hazards. [10]

Rationale for a Regional Approach

The project meets all four eligibility criteria of IDA regional window operations.

15. **First, the proposed project will include four countries (Liberia, Sierra Leone, Chad, and Togo).** The four countries[11] were selected on the basis of: (i) the country requesting emergency support (to tackle oil price rise and resulting fiscal stress in Liberia, Sierra Leone, and Chad and to address the security situation in Northern areas of Togo) and (ii) analysis that with minimal investment, sufficient grid wheeling capacity of the power grids to absorb the solar project can be created. All four countries are also IDA eligible.

16. **Second, there is clear evidence of ownership of the operation with a commitment to jointly implement the project.** All four countries have indicated intent to sign an MoU agreeing to the regional institutional and procurement arrangements for the project as well as a desire to share knowledge. Similarly, all four countries have allocated and secured land for the operation.

17. **Third, proposed RESPITE TA to WAPP will assist the regional entity in developing a high level of policy harmonization to broadly support its regional strategy.** RESPITE will ensure that sub-projects adhere to consistent standards for grid integration of solar PV and battery storage developed by WAPP as part of previous regional integration projects (namely WAPP-CLSG Project, P113266). At the same time, the experience and lessons learned from RESPITE and the standard models developed for public procurement of emergency solar can be replicated in other situations as needed. The project also supports TA to WAPP to strengthen regional integration by improving grid synchronous operation, preparation of regional

[8] ND-GAIN Index, which summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience. Available at: *https://gain.nd.edu/our-work/country-index/*
[9] *https://climateknowledgeportal.worldbank.org/country/niger/climate-data-projections*
[10] According to World Bank's Lifelines report (2021), the cost of disruption to infrastructure power sector due to natural shocks was about 2 percent of GDP in 2019.
[11] It should be noted that Liberia, Sierra Leone and Togo are members of ECOWAS (WAPP), which aims to enhance regional energy trade among its member countries. While Chad is not a member, it participates in regional energy trade activities through the Chad-Cameroon interconnector, which has received funding by the World Bank (P168185).

transmission projects and increasing WAPP capacity.

18. **Fourth, RESPITE provides benefits that spill over country boundaries.** The regional approach developed for RESPITE (i) provides economies of scale; (ii) increases potential for regional trade through development of generation capacity and optimization and synchronization of infrastructure; and (iii) develops regional public good by facilitating knowledge sharing and capacity building. This is described further below.

19. **RESPITE will encourage leading international private developers to enter smaller more fragile economies and help set a benchmark for solar pricing, giving the governments in the region a reference point for future development of solar.** RESPITE and its approach of aggregating capacity needs across the four countries will provide a large enough demand to attract leading international private players that tend to stay away from smaller and fragile countries. Individual country experience demonstrates that procurement of smaller scale solar and storage projects makes it more difficult to attract viable bidders. Aggregating procurement by following a regional approach reduces transaction costs, the international players have the potential to provide the infrastructure at lower cost with greater economies of scale, and the cost of generation could be reduced over the lifetime of the PV assets developed for the project, as opposed to the high generation costs from thermal generation without the project. The interventions, though publicly funded, will also help set a benchmark for solar pricing in the region giving countries a reference point against which they can compare results of competitive bids from private sector for future solar projects.

20. **RESPITE will increase regional integration, enhance the potential for power trade, and improve the enabling environment for integration of renewable energy in the regional energy mix.**

(a) First, RESPITE will connect to the CLSG interconnector: (i) 20 MWp of solar generation capacity and 41 MW of hydro in Liberia, both already part of the WAPP masterplan, and (ii) another 45 MWp of solar power in Sierra Leone, further increasing regional capacity that can be traded. In Chad, although not a part of WAPP, the development of 35 MWp of solar with battery storage would allow for future regional trade through the Chad and Cameroon interconnection.
(b) Second, RESPITE will support the synchronization of WAPP grids, including that of Togo; this is a critical step to improve regional integration.
(c) Third, the project will support the optimization of power networks in RESPITE participating countries while also improving the reliability of electricity supply in each country. This is achieved by ensuring that there is sufficient wheeling capacity to absorb the new generation, ultimately boosting readiness for regional trade. At the same time, based on grid integration analysis undertaken in all participating countries, the project will support the development of battery storage systems that will help manage the grid and improve reliability of supply.

21. **RESPITE will complement existing regional integration efforts by supporting the WAPP in fostering efficient regional power trade and by supporting investment in transmission and generation infrastructure to integrate the markets physically.** The World Bank and other donors are financing the construction of sections of the regional transmission infrastructure, with 4,932 kms of transmission lines and 38 substations either completed or under implementation in the WAPP, and the World Bank is preparing further investments in high voltage transmission lines. Support is also being provided to establish the institutional, operational, and commercial frameworks needed to allow regional trade and thereby leverage the large investments in physical infrastructure. RESPITE will support WAPP activities that will

support (i) finalization and operationalization of the legal, regulatory and technical frameworks to enable efficient regional trade between WAPP countries; (ii) technical integration of the WAPP network by improving the synchronous operation and reliability of interconnectors; (iii) preparation of priority regional generation and transmission projects as per the WAPP Master Plan 2018; and (iv) strengthening of the institutional and technical capacity of the WAPP General Secretariat to undertake its regional mandate.

22. **Among other benefits, RESPITE will lead to a significant reduction in emissions generating positive externalities for the region.** As described above, the region has a high risk of river and urban floods, water scarcity, extreme heat, and wildfires. Reductions in regional emissions can help countries potentially avoid damage to scarce and valuable human and natural capital. Depending on the scenario under consideration, the regional project is expected to reduce the GHG emissions by between 10 to 13 MtCO2e. RESPITE will also help avoid some subsidies (0.2 percent of GDP on average) to the utilities that would have otherwise been needed, and significantly reduce the generation cost (68-75 percent) incurred by the recipient country. More details are provided in the Economic and Financial Analysis section.

23. **The project will also ensure that the knowledge gained through the project by the various participating countries (in particular on procurement and operations and maintenance [O&M]) is curated and available for any other country that faces similar issues.** This will be achieved through:
    (a) **Wider regional level collaboration with WAPP.** Given the need to respond quickly to the crisis outlined above, RESPITE will formalize a standardized model for public procurement of solar that can be rapidly deployed to address *emergency situations* and will develop standardized procurement procedures that can be used to adapt to other countries. The project will collaborate with WAPP to curate the documents and knowledge created during the project and ensure that any other country can access it.
    (b) **Establishment of a RESPITE Coordination Unit (RCU)** which will comprise of the Panel of Experts (PoE) on procurement of solar power plants, battery storage, and T&D that would transfer knowledge in terms of market assessment, preparation of bidding documents (BDs) for technical and procurement design, and ensuring implementation of Environment and Social (E&S) standards. The RCU will be responsible for producing the standardized documents.
    (c) **Building trust and creating a demonstration effect.** The project will also bring together four countries, including Chad that is not part of any other regional forum with these countries. The four countries working together, learning from each other, to deploy solar power in the context of regional fragility will help build trust and create a regional bond between the participants facilitating future regional integration. Given the lack of existing solar projects in the participating countries, the project will also help create a demonstration effect, paving way for additional opportunities for solar development, regional trade and interconnection between the countries and regional institutions (Economic Community of West African States [ECOWAS], WAPP).

24. **RESPITE is aimed at addressing the immediate power supply crisis in the participating countries; it complements the medium to long term strategy in each country.** By addressing the immediate crisis, RESPITE ensures that the long-term World Bank engagement focused on structural reforms is not disrupted. In Sierra Leone, the proposed project supports the long to medium term aim to increase energy access in both the district headquarter towns and rural areas and improve power sector infrastructure and the operational and financial performance of the utilities through its existing Sierra Leone Energy Sector Utility Reform Project (P120304) and Enhancing Sierra Leone Energy Access Project (P171059). In Chad, RESPITE complements the medium-term sector engagement goals to triple the access to electricity (Chad

Energy Access Scale Up Project ,P174495), increase trade between Chad and Cameroon (Cameroon-Chad Power Interconnection Project P168185) and address systemic issues around governance and transparency, sector financial sustainability and regulatory issues (Supporting Reform and Investment to Expand Access to Affordable and Financially Viable Energy,P174985). In Liberia, the energy sector engagement is focused on increasing electricity access through both grid and off grid solutions (Liberia Electricity Strengthening and Access Project [LESSAP], P173416), supporting the distribution utility's transition to full time sustainable local management, improving governance and commercial operations of the utility, and supporting capacity building in the sector (Liberia Second and Third Development Policy Operation- P175570, P176993). In Togo, World Bank engagement focuses on improving financial viability of the sector utility through tariff reforms and support the expansion of access in the country through its various projects (Togo 2nd Development Policy Financing [DPF], P172023 and Energy Sector Support and Investment Project, P160377).

C. Sectoral and Institutional Context

Sierra Leone

25. **Currently Sierra Leone has only three major sources of power generation: a hydropower plant (HPP) that operates at less than 10 percent of its capacity in the dry season, the 10 MW CLSG interconnector and a private HFO based barge**. These three main sources for electricity generation are: (i) Bumbuna hydro power plant (5 MW-50 MW depending on dry or wet season); (ii) Karpowership (60 MW IPP); and (iii) the CLSG regional transmission line (10 MW Power Purchase Agreement [PPA] and 27 MW-Transmission Service Agreement [TSA]). However, the available generation capacity, including from the Karpower barge, is about 80 MW in the wet season and only about 70 MW or even lower in the dry season because Bumbuna can supply only 5–10 MW in the dry season and there are also constraints on the transmission line from Bumbuna to Freetown. Other than these three sources, Electricity Generation and Transmission Company (EGTC) has 24 MW HFO units that are not operating because of poor maintenance and a lack of spare parts.

26. **Only 26 percent of the population in Sierra Leone has access to electricity while the utility faces financial challenges even though average retail tariffs at around 18cents/kwh are among the highest in the world.** Electricity Distribution and Supply Authority (EDSA), the distribution utility, has high losses and low collections, and is facing challenges in paying for its power purchases and meeting current demand in the country. According to a recent subsidy report commissioned by the World Bank, EDSA's liabilities stood at 125 percent of its revenues as of August 2021 and its revenues covered only a small part of the cost of purchasing power from EGTC and IPPs. The dollar denominated contracts with the IPP cause severe financial stress as the Sierra Leonean Leone (SLL) depreciates and oil prices increase. At the end of 2021, Ministries, departments, and agencies owed about SLL253 million (US$14.38 million) or 60 percent of EDSA's current outstanding arrears, further exacerbating financial stress. In addition, EDSA is also currently challenged with ageing distribution network infrastructure. The financial situation at EDSA is having a direct negative impact on the country's fiscal situation as the Government of Sierra Leone (GoSL) has provided a total subsidy equivalent to US$63.76 million during 2018-20 which in 2020, represented 6.4 percent of the government's expenditures and 1.56 percent of GDP. The estimated direct subsidy for 2022 could reach US$100 million due to increasing fuel prices. With retail tariffs at around 18 cents per kwh (but falling rapidly in real terms due to currency depreciation), way below the rising cost of supply, the situation is only getting worse. With high losses, low collections and high oil prices due to war in Ukraine, EDSA is

constrained to cover the costs of purchasing electricity from IPPs. 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.

27. **While Sierra Leone is already planning to increase offtake from the CLSG line, it will be insufficient to meet demand**. Both Sierra Leone and Liberia were able to use the CLSG line to purchase power from Cote d'Ivoire, thereby reducing the fiscal impact substantially. In Sierra Leone alone the first month of CLSG power availability in Freetown reduced the power purchase bill by almost US$1 million. Countries are finalizing plans to increase their offtake from the CLSG lines for the coming dry season. However, the existing and planned capacity will not be enough to meet all the existing demand in the countries, forcing them to increase the liquid fuel-based generation.

28. **Sierra Leone is endowed with abundant renewable energy resources, particularly hydropower and solar energy.** The country has significant untapped hydro potential. Similarly on solar, a recent IFC study estimated that the country could easily accommodate 130 MW of solar PV capacity by 2026 provided the adequate transmission capacity is established. 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 100 MW of solar through 2025 and another 80 MW of solar and storage by 2027; the initial investment is defined as 45 MWp solar in 2022.

Liberia

29. **Liberia has one of the lowest electrification rates (28 percent) in the world and a high grid tariff (24 ¢/kWh[12]) with Liberia Electricity Corporation (LEC), the sector utility, facing financial challenges**. 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. High system losses, a small customer base, dependence on high-cost thermal plants during the dry season (January-April) and the relatively high operating and administrative expenses of LEC undermine its financial sustainability. Over the past few years, the financial performance of LEC has been worsening, with sustained operating losses and cash balances dwindling from US$32.6 million in 2015 to US$1.8 million in 2019. The utility's capital expenditures (capex) are supported by grant funding from the Government (on-granted donor funding) which helps to sustain its operations. However, commercial losses from power theft perpetuate high costs and resulting tariffs. With over 60 percent of sales revenues coming from pre-paid customers, the operational efficiency of LEC is predominantly a billing (system-loss) issue rather than a collection-efficiency issue. In fact, the collection rate in 2022 thus far is over 90 percent.

30. **The decade-long civil war had destroyed the electricity infrastructure including the main generation source of the country (Mt. Coffee hydropower) leaving the country dependent on expensive liquid fuel for generation during the dry season**. Concerted efforts from development partners including the World Bank have been made to rebuild the electricity infrastructure; the Mt. Coffee hydropower rehabilitation was completed recently and provides about 88 MW of hydropower during the wet season (June-December). However, due to the high seasonality of the hydropower, during the dry season (January-May), the country relies on expensive liquid fuel plants to meet the electricity needs. The effective thermal capacity of 32 MW is grossly inadequate to serve the demand, which resulted in massive load-shedding

[12] Residential prepaid tariff.

during the current dry season leaving many areas with electricity supply for only a few hours of the day. Liberia power demand is projected to increase about 10 percent annually requiring mobilization of thermal power plants to meet the demand even in the coming rainy seasons. The surging oil price, which is expected to remain in the next few years, will severely exacerbate the utility's financial situation.

31. **Liberia is now connected to the regional network with support from the World Bank financed regional project (CLSG),** but the tariff and the potential capacity constraints in the supplying country (Côte d'Ivoire) make import less competitive than what was originally envisaged. The poor creditworthiness of LEC as well as potential capacity constraints in Côte d'Ivoire implies that adequate import through CLSG to meet the full dry season needs will be neither practical nor affordable to Liberia.

32. **The least cost generation expansion plan has identified 90 MW of solar grid connected plants (to be implemented in phases) and the expansion of the existing HPP of Mt. Coffee as part of the least cost options for meeting the electricity needs of Liberia**. It is expected that 20-30 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. Preparation of the two projects including environmental and social assessment has quite advanced with the oversight of the World Bank.

Chad

33. **Chad is a global outlier in terms of energy access with only about 11 percent of its population with access to electricity, most of which are served by the N'Djamena grid that relies entirely on liquid fuels for power generation**. Despite the endowment of fossil fuels and excellent solar potential, Chad has one of the lowest electricity access rates in Africa at 11 percent.[13] Electricity access is mostly limited to a dozen cities that are energized by isolated power systems. By far the biggest system serves the capital city of N'Djamena; it accounts for some 90 percent of electricity sales by the national power utility, National Electricity Company – Chad (*Societe Nationale d'Electricite du Tchad*, SNE), even though the system covers only about 1/3 of the capital city. The N'Djamena power system has about 150 MW of installed capacity, all thermal using diesel and HFO that results in power generation costs at the point of injection into the system exceeding US$0.2/kWh. Only some 90 MW are usually available, which is not sufficient to meet the growing electricity demand, in particular during the hot season from March to September, let alone serving those currently unelectrified. Recently, the available capacity dropped to as low as 70 MW due to the withdrawal of one of the IPPs. As a result, most of the districts in the capital city face daily interruptions in power supply and some parts of the city connected to the grid are left without electricity for days. Overall, the power sector in Chad is underdeveloped, with most of the country lacking a stable and reliable power supply and domestic demand for electricity being largely unmet.

34. **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 difficult for the company to even maintain its assets, let alone finance any of the investments so dearly needed across the whole supply chain, or attract private investment in power generation**. SNE increasingly relies on support from the Government of Chad, in the form of in-kind subsidies (fuel to the power stations), which imposes a considerable burden

[13] Tracking SDG7: The Energy Progress Report, 2022.

on the fiscal budget, and presents significant opportunity costs if liquid fuels are used in power generation especially at times of higher fossil fuel prices on international markets. The subsidies provided to SNE amounted to US$84 million in 2019 (0.8 percent of the national GDP). Due the dramatic increase in oil prices in 2022, the effective subsidies provided to the sector are expected to increase by some 75 percent compared to 2019 and exceed 1.4 percent of GDP in 2022 and 2023. Despite significant recurrent public subsidies, SNE faces chronic cash shortages. Public entities and a number of other categories of customers were released by the state (often implicitly) from the obligation to pay for electricity. This, together with deficient commercial practices, stripped SNE of cash and caused the accumulation of payables and receivables that now exceed SNE's annual revenue. As a result, SNE's financial situation is very fragile, affecting its ability to operate efficiently, properly maintain its assets or invest in access expansion. The persistent loss-making operation of SNE also badly affects the private sector appetite to invest in power generation as SNE is not a creditworthy off-taker.

35. **The remarkable solar energy potential in Chad remains unrealized.** Solar energy is by far the most abundant renewable energy resource in Chad. Global Horizontal Irradiation varies between 5.8 kWh/m²/day in the South and 6.8 kWh/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 PV and storage with around 130 MW of solar PV and 160 MWh of energy storage capacity already needed by 2023. In the past decade, the Government of Chad signed some 20 MoUs with the private sector developers for solar energy IPPs, but the bulk of them remained at the MoU stage. None of these projects has reached financial closure even though several of them have benefitted from financing, guarantee instruments, and political backing from IFIs and bilateral donors. All solar energy projects initiated to date came through unsolicited proposals that in the absence of established market-based prices for utility scale solar energy in the country, resulted in inflated cost of solar energy (even if still only on paper).

Togo

36. **Togo's public electricity utility, Electric Power Company of Togo (*Compagnie Energie Electrique du Togo,* CEET) faces profitability and solvency issues**. The public utility CEET is responsible for distribution of electricity within the country. CEET owns some generation assets, but it is primarily a distribution company, and it purchases most of its power from Electricity Community of Benin (*Communauté Electrique du Benin*, CEB), the binational transmission and generation company co-owned by Togo and Benin, as well as IPPs. CEET is facing persistent financial difficulties, which are unlikely to be resolved unless the discrepancy between tariffs (US$0.18/kwh) and cost of service (US$0.19/kwh) is addressed[14]. Unaudited financial statements show a negative net result for the past two years, during which the shareholders' equity situation has also deteriorated. The utility is indebted, with total debts (long and short term) estimated at over US$450 million for the past two years. Without further action to improve CEET's financial situation, its deficit will worsen, undermining the government's electrification ambitions.

37. **The security situation in the northern Savanes region has prompted the government to focus on service delivery, including by increasing access to electricity through PV generation, distribution and transmission investments.** The health crisis linked to COVID-19 and associated slowdown in economic activity have resulted in an increase in poverty and fragility, particularly in the northern region bordering

[14] Both, the tariff and the cost of service are based on 2021 data

Burkina Faso. Faced with a deteriorating security situation in the region, the government launched the Emergency Resilience-Building Program in the Savanes Region (PURS), which addresses underlying drivers of fragility by increasing access to government services and increasing opportunities for income generation. Among the least electrified in the country, the Savanes region will benefit from both grid extensions and new grid and offgrid generation under the PURS[15], while taking into account specific vulnerabilities of the households, in particular female-headed ones. Delivery of the PURS is entrusted to the Togolese Agency for Rural Electrification and Renewable Energy (AT2ER)[16], which has accumulated relevant electricity production and distribution project experience over the years. This includes the construction of the 50 MW solar power plant in Blitta in 2021, as well as many other rural electrification projects with technical and financial partners such as the African Development Bank, the Islamic Development Bank, the European Union, the West African Development Bank and many others. AT2ER works in close collaboration with CEET for grid extension projects to ensure adequate technical standards for the electricity grid in rural areas, which once built are transferred to CEET for operation.

38. **The Government of Togo has begun increasing the share of renewable energy in the generation mix through a series of solar PV projects and a transmission line to transit the power across the country.** The government's Generation Transport Distribution Master Plan (*Plan Directeur de production, transport et distribution de l'énergie électrique*, PDMC), financed under the Togo Energy Sector Support and Investment Project (*Projet de Réforme et d'investissement du Secteur de l'Energie au Togo,* PRISET; P160377), includes an ambitious target of 50 percent renewable energy generation and of reducing imports to 30 percent by 2025. The PDMC calls for approximately 300 MW in solar capacity additions in 2023 and an additional 60 MW in 2024 (including the Dapaong site). The PDMC also includes significant amounts of BESS to manage the influx of Variable Renewable Energy. In order to facilitate the transit of electricity to the northern part of Togo from the interconnected network of CEB, the government has launched the KAMADAMA project, a 161 kV transmission line linking Kara-Mango-Dapaong-Mandouri-Togo/Benin border with a length of about 312 km, 161/20 kV substations in Mango, Dapaong, and Mandouri and the extension of the 161/34,5/20 kV substation in Kara. The line will also enable the transport of power from new solar power plants in the northern towards central and southern Togo. This project will promote the exchange of energy within Togo but also with neighboring countries, helping the country reduce the high costs of supply and network operation in the northern region of Togo. The commissioning of the line initially planned for November 2022 has experienced some delays and is now planned for August 2023.

D. Relevance to Higher Level Objectives

39. **The proposed project supports the World Bank's priorities in the West and Central Africa region to transform the region's economy and promote inclusive growth by supporting critical infrastructure**. RESPITE is in line with two pillars of the World Bank's regional priorities in West and Central Africa as it (i) removes the bottlenecks that prevent firms from creating jobs by supporting interventions that aim to fill infrastructure gaps especially pertaining to electricity; and (ii) supports climate change mitigation and adaptation by reducing the use of liquid fuel-based generation in West and Central Africa and replacing it

[15] 1000 km of Medium Voltage (MV) and 700 km of low voltage (LV) lines, 9,000 streetlights, and four diesel-based generators of 4 MW of capacity are planned. The program plans to electrify 342 localities and about 30 military command posts through mini-grid systems, giving access to electricity to approximately 492,500 people (~98,500 households).
[16] AT2ER was created in 2016 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.

with cleaner solar and hydro[17]. RESPITE plans to install 142 MWp of grid connected solar and 41 MW of hydro that will help increase supply of clean electricity to the grid, make power supply more reliable while reducing the fiscal impact of the sector in these countries.

40. **The proposed project's investments will help improve utility finances and improve grid reliability, addressing two of the fundamental issues that have discouraged private sector from investing in the participating countries.** The four participating countries have limited private investment in the power sector for several reasons, such as – financially unviable off takers, unreliable infrastructure, and macroeconomic constraints, among others. The project investments in solar power plants will help lower power purchase costs for utilities that have seen these costs double in the last one year. Lower power purchase costs in conjunction with existing World Bank interventions on revenue protection in these countries will help improve utility finances. Additionally, adding battery storage to the grid and the associated T&D investments will help improve the reliability of the grid and also demonstrate the viability of grid connected solar in countries that have are yet to experience demonstration of solar power, encouraging private sector investments at renewable energy in the medium term. The emergency project being deployed only once, while aiming to address a crisis through public funded deployment of PV, is eventually aligned to enabling conditions for the private sector to take a larger role in the sector.

41. **RESPITE is aligned with the CASCADE principles of WBG strategy to address the power crisis in West and Central Africa with two separate yet complimentary solutions from World Bank and IFC being offered to clients at the same time.** World Bank's RESPITE offers competitive procurement of public funded emergency solar power while IFC supported Release offers direct contracting with the private sector. The joint approach, offered to countries based on their domestic conditions and readiness, follows CASCADE principles as it helps in creating the enabling environment for the private sector to get involved in the sector moving forward. First, a joint approach presents an integrated IDA strategy that ensures that regional and national IDA allocations (used by RESPITE) complement the IDA Private Sector Window facility (used by Release). Second, RESPITE is offered as a solution to countries where the private sector has not been able to intervene in the market and hence, it demonstrates the viability of grid connected solar and establishes benchmark prices for utility scale solar that can be used for subsequent privately financed solar energy projects by IPPs. Third, with a net positive effect on the utility finances, the project will improve the creditworthiness of the off taker (utilities) in the countries, giving the private sector some confidence to enter the market. Fourth, the project will help build capacity in the countries to effectively integrate renewable energy into the grid, creating the technical enabling environment for further deployment in the future.

42. **RESPITE is aligned with the ongoing WBG's Country Partnership Frameworks (CPF) for Sierra Leone, Liberia, and Togo, and the Country Engagement Note for Chad.** The CPF for the Republic Sierra Leone for the period FY21-FY26[18] aims to improve the reliability of supply to enhance competitiveness of the country's economy. In Liberia, the CPF for the period of FY19-FY24[19] targets expansion of reliable electricity services to narrow the infrastructure gap to foster more equitable development in the country. In Chad, the recently discussed Country Engagement Note for the period of FY23-FY24[20] envisages investment in

[17] Supporting a Resilient Recovery: The World Bank's Western and Central Africa Region Priorities 2021-2025.
[18] Report No. 148025-SL, discussed by the Board of Executive Directors on May 26, 2020.
[19] Report No. 130753-LR, discussed by the Board of Executive Directors on November 27, 2018.
[20] Report No. 177572-TD, discussed by the Board of Executive Directors on November 29, 2022.

energy sector under Focus Area 3 (Resilient Productivity and Connectivity) to address the greatest binding constraint to Chad's growth and broader economic activity. In Togo, the CPF for the period of FY17-FY22[21] calls for strengthening energy services to improve private sector performance and job creation.

43. **RESPITE is aligned with Sierra Leone's aspirations to be a middle-income country by 2039, as outlined in its Medium-Term National Development Plan (MTNDP) 2019-2023.[22]** The MTNDP notes that access to reliable electricity is a key input for realizing the GoSL's goal of creating a diversified, resilient, and competitive economy with a well-developed infrastructure. For the past year, Sierra Leonians have been facing widespread outages as the country becomes more and more dependent on a single HFO based barge for its electricity. The project will support the emergency deployment of about 40 MWac of solar with storage solutions to help alleviate the country's critical fiscal situation and increase supply to the grid during the dry season. The project will support the GoSL in moving towards its long-term target to increase installed generation capacity to 350 MW and increase the share of renewables to 65 percent by 2023. The project intervention also helps Sierra Leone achieve the targets mentioned in its recently updated Intended Nationally Determined Contributions (INDC) such as reduction in CO2 emission levels by 25 percent by 2050.

44. **RESPITE is aligned with the Economy and Jobs pillar of Liberia's Pro-Poor Agenda for Prosperity and Development (PAPD) 2018-2023.[23]** Building new infrastructure is a critical component of providing greater income security to Liberians and reducing absolute poverty in the country - goals outlined in the PAPD. RESPITE will support Liberia's intention to enhance economic productivity by increasing investment in generation and move towards the targets mentioned in the PAPD such as reducing energy cost and increasing installed generation. Liberia has identified the energy sector as a key contributor towards GHG mitigation. The project will also directly contribute towards supporting's Liberia's stated targets in the 2021 INDC[24] of reducing GHG emission by 64 percent below the business as usually levels by 2030.

45. **RESPITE supports Chad's ambition to be an emerging regional power by 2030 as laid out in its Vision 2030[25] document**. Chad seeks to implement the vision through the National Development Plans (NDP) to accelerate structural transformation in the economy. While the NDP for 2022-26 is under development, the NDP 2017-2021[26] clearly notes the importance of electricity in strengthening the competitiveness of the economy. RESPITE is in complete alignment with Axis 3 of the NDP that aims to establish a competitive and diversified economy by providing access to energy. With the addition of 30 MW of solar to the installed capacity and more importantly setting a benchmark for the government to procure solar through competitive procurement, RESPITE will help Chad move forward on its vision for 2030 "The Chad We Want-*Le Tchad que nous voulons*".

46. **RESPITE intervention in Togo is in line with the country's ambition to structurally transform the economy for job-creating growth and improving social well-being**. The NDP for 2018-2022[27] identifies the role of electricity sector in developing agriculture processing, manufacturing, and extractives industries in the

[21] Report No. 112965-TG, discussed by the Bord of Executive Directors on May 16, 2017.
[22] Republic of Sierra Leone, Sierra Leone's MTNDP 2019-2023, 2019
[23] Republic of Liberia, PAPD, 2018
[24] Republic of Liberia, Revised INDC, 2021
[25] Chad, Vision 2030. 2017
[26] Chad, Chad NDP 2017-2021, 2017
[27] Togo NDP 2018-2022, 2018

country. Access to reliable electricity is a major hindrance meeting the goals set out in the NDP. RESPITE intervention in Togo plans to install 25 MW of solar as well as the needed T&D infrastructure needed for this power to be evacuated and supplied to the end user in areas where access to reliable electricity is an issue. RESPITE will also help Togo progress on its aspiration to have long-term low-carbon and climate-resilient development as mentioned in the INDC.

47. **RESPITE is aligned with the Africa Regional Integration Strategy[28] and the Africa Regional Energy Strategy.** The former renews IDA's commitment to supporting regional market integration, on the basis that countries that struggle to trade with their neighbors could typically find it harder to integrate with global value chains. The energy market is identified as a priority for integration considering the associated benefits in terms of competitiveness and sustainability for the participating economies. The increasing of renewable capacity in the region directly supports Strategic Priority 1 of the Regional Integration Strategy, that is to generate economic dynamism along regional economic corridors, and Strategic Priority 2 to develop functioning regional markets in identified priority sectors. The Africa Regional Energy Strategy likewise identifies regional integration as a foundation for the achievement of energy objectives. In addition to the development of cross-border infrastructure for generation and transmission of larger scale and lower cost generation, the strategy emphasizes engagement on a further dimension of regional integration that is central to this operation: strengthening institutional capacity and multi-stakeholder processes.

48. **The proposed project is aligned with the WBG Gender Strategy**. The 2016–2023 WBG Gender Strategy's main objectives include closing gaps in health, education and social protection as well as removing barriers to women's ownership of and control over assets. In particular, the project will reduce the disparity of access of poorer households and in particular of female-headed households within this category to access electricity in Togo. In addition, aligning with the Gender Strategy's emphasis on the promotion of employment and economic opportunities, and given that employment-focused interventions are also embedded in ongoing or planned projects such as the Liberia Electricity Sector Strengthening and Access Project (LESSAP, P173416) as well as the Togo Increased Digital Connectivity and Electricity Access (IDEA, P176769), actions will also build upon these relevant interventions and will seek complementarities and efficient uptake of lessons learned wherever possible.

49. **The proposed project is aligned with the Global Crisis Response Framework (GCRF) published by the WBG in July 2022**. The GCRF provides a framework for WBG operational response to the multiple current crises facing the world. The scope of the RESPITE project falls under two of the four Pillars of the GCRF: (i) *Pillar 3 - Strengthening Resilience*: the project will support the design, supply and installation of solar power that will increase the supply of clean and green renewable power for the participating countries. The project will also support distribution expansion and the optimization of transmission such that the newly installed capacity is connected to regional interconnectors, making the network more resilient through increased potential for regional trade (Component 1, US$184 million; Component 3, US$15.5 million) and (ii) *Pillar 4 - Strengthening Policies, Institutions and Investments for Rebuilding Better:* by building capacity to procure, operate and maintain solar power plants in the countries, the project will help establish the ecosystem needed to expand solar power. The project also supports the expansion of hydro power plant in Liberia. Both the interventions are key elements of the WBG integrated approach to promoting strong and durable recovery and growth through green, resilient and inclusive development (Component 2, US$61 million,

[28] Report No. 154458-AFR

Component 4, US$50.5 million).

II. PROJECT DESCRIPTION

A. Project Development Objective

50. The Project Development Objective (PDO) is to rapidly increase grid-connected renewable energy capacity and strengthen regional integration in the participating countries.

51. The progress towards achieving the PDO will be measured by the following indicators:
    (a) Generation capacity of energy constructed or rehabilitated (CRI, MW);
        (i) Hydropower generation capacity rehabilitated under the project (CRI, MW);
        (ii) Renewable energy generation capacity (other than hydropower) constructed under the project (CRI, MW)[29];
    (b) Net greenhouse gas (GHG) emissions (CRI, metric tons/year);
    (c) Installed capacity of battery storage (MWh);
    (d) Generation capacity for regional power trade in ECOWAS (MW);
    (e) Supply of renewable energy (GWh);
    (f) WAPP Priority projects brought to the point where investment-grade feasibility studies and associated documentation have been completed (number);
    (g) Ratio of annual total hours of synchronization of WAPP areas 1, 2 and 3 against total hours in a year (percentage).

B. Project Components

52. The project will support (i) the installation of solar and hydropower generation and battery storage capacity with near-term (about three-year) O&M contracts for the provision of solar supply; (ii) as needed, necessary grid connection infrastructure; (iii) grid modernization to ensure effective penetration of variable solar generation (iv) distribution expansion; and (v) capacity building among the implementing agencies and TA for greater regional integration.

53. **Component 1: Construction of Solar PV, BESS and Grid Connections (US$184 million equivalent IDA)** will finance all costs associated with the Design, Supply and Installation (DSI) and O&M for the one to four years of the solar PV power plants and any associated works for grid connection.
    (a) *Sub-Component 1A: Construction of 20MWp/16 MWac Solar PV power plant on Mount Coffee Island in Liberia (US$21.5 million IDA equivalent)* will finance all costs associated with the DSI of a 20MWp/16 MWac Solar PV power plant, O&M for one to three years of operation, and any associated works (including construction of transmission lines) for connection to the grid. The proposed site will be on Mount Coffee Island at the existing Mount Coffee hydropower plant (MCHPP). The solar plant will be connected to a 22 kV busbar at the MCHPP substation. With the nearby MCHPP maintaining grid stability, no battery storage is planned for the

[29] 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 116 MW) by year two.

system. The component will also finance the grid interconnection that will be done after replacement of the 66(132)/22kV transformer. The government has already completed the feasibility study at the proposed site. Support for O&M will include training and capacity building at the utility to ensure that the utility staff have the technical know-how to operate and maintain the power plant.

(b) *Sub-Component 1B: Solar PV and Battery storage at two locations in Sierra Leone (US$63.5 million IDA equivalent)* will finance all costs associated with (i) the expansion of an existing 5 MWac/ 6 MWp power plant at Newton to 35 MWac/45MWp, adding storage to it and undertaking works for power evacuation, and O&M for the first three years, and (ii) the addition of about 10 MWac/13 MWp ground mounted solar PV with battery storage, undertaking works for power evacuation, and O&M for the first three years at Lungi and Newton. Feasibility studies have been completed for both sites. Support for O&M will include training and capacity building at the utility to ensure that the utility staff have the technical know-how to operate and maintain the power plant.

  (i) *Development of 39 MWp (30 MWac) with 15 MWh Battery storage and addition of 7 MWh battery storage to the existing 6 MWp/5 MWac at Newton (US$44 million):* A 6 MWp solar power plant has been developed in the Newton area through a grant to GoSL from Abu Dhabi Fund for Development. This component will finance the DSI and O&M for the first three years of operation for additional storage capacity for the existing plant and the addition of 39 MWp (30 MWac) of ground mounted solar PV with 7MWh of battery storage. The proposed site is located at 8.322621°, -12.993666 with the government already having acquired 120 acres of land. The site will be linked to the proposed Waterloo substation through a 33kV line and further to the 161kV Bumbuna transmission line to Newton.

  (ii) *Construction of 13 MWp (10 MWac) solar PV plant in Lungi Airport Area with 6MWh storage (US$19.5 million):* A 13 MWp (10 MWac) solar PV site is planned in the Lungi area that houses the Lungi International airport. The government has identified land (8.663171, -13.187704) for this purpose. The proposal is for a 13 MWp (10 MWac) fix tilt PV power plant to be connected to the existing MV switching station at Lungi through 11kV lines. The sub-component will finance the DSI and O&M for the first three years of operation for the power plant and 6 MWh storage system as well as the construction of 11kV connection to the existing 11kV substation.

(c) *Sub-Component 1C: Solar PV and Battery Storage in Chad (US$54.5 million equivalent IDA)* will finance the DSI for 35MWp/30MWac ground mounted solar PV power plant and battery storage estimated at 60 MWh near the existing Gassi substation, any grid related investments and works needed for connection of the solar PV and storage to the N'Djamena grid, and an O&M contract for one to three years to help SNE build their capacity in operating and maintaining solar PV and storage power plant. Feasibility and grid integration studies (jointly assessing RESPITE and IFC supported Release interventions) are underway. The feasibility and grid integration studies will also guide the final dimensions for both Solar PV and energy storage capacity to be supported by the project. The land to be used is located at 12.053759, 15.197517. Support for O&M will include training and capacity building at the utility to ensure that the utility staff have the technical know-how to operate and maintain the power plant.

(d) *Sub-Component 1D: Solar PV and Battery Storage in Togo (US$44.5 million equivalent IDA*) will finance the DSI for a 25 MWp solar PV plant with storage expected to be at least 40 MWh at

Dapaong, the plant's grid connection with construction of approximately 10 kilometers electrical lines, and possible upgrades at the nearest substations. This project is included as part of Togo's least cost generation plan from 2021 for commissioning by 2024. ToR for feasibility and grid integration studies have been prepared. A 74.8 ha land has been identified for the purpose of the project[30]. This component will also finance the O&M for the first three to four years of operation that will include training and capacity building at the utility to ensure that the utility staff have the technical know-how to operate and maintain the power plant.

54. **Component 2: Expansion of Mt. Coffee Hydro Power Plant and Dam Safety Enhancement (US$61 million equivalent IDA)**

(a) *Sub-Component 2A: Expansion of Mt. Coffee Hydro Power Plant with the installation two new turbines (US$58 million equivalent IDA)* will finance all costs associated with expansion of the MCHPP in Liberia. The project will fund the expansion of an existing 88 MW MCHPP by adding an additional capacity of 41 MW to increase the installed capacity of the project to 129 MW. Through the project, the expansion will fund installation of two turbines, each having a maximum capacity of 20.5 MW. The expansion was planned during the MCHPP rehabilitation and as a result the intakes for two additional units were already built and no modification of the Mt. Coffee dam is required. The powerhouse would be expanded for the two new units. No modifications are needed for the control building as the expansion had already been planned during original construction. The associated civil works including construction of two penstocks, erection bay and extension of tailrace channel will also be financed under this component. The component may also finance technical solutions to increase the generation efficiency of the power plant, which will be determined during the project implementation.

(b) *Sub-Component 2B: Dam Safety Enhancement for Mount Coffee Hydro Power Plant. (US$3 million Equivalent IDA)* will finance the implementation of the dam safety management program in Liberia and review and update of the dam safety plans that include –(i) instrumentation (monitoring) plan with repair of damaged instruments and installation of new instruments to monitor the dam behavior and performance in a satisfactory manner; (ii) O&M plan with extraordinary maintenance of the hydromechanical equipment of the spillway, and capacity building; and (iii) preparation and implementation of a full-fledged Emergency Preparedness Plan. The component will also assist the Government of Liberia to develop a mechanism to mobilize required financing for long term implementation of the dam safety program, including regular inspection and maintenance activities, and periodic detailed dam safety inspections and reviews by an independent dam safety specialist.

55. **Component 3: Distribution Expansion and Transmission Optimization (US$15.5 million equivalent IDA)** will finance the expansion of distribution networks and optimization of transmission in Sierra Leone and Togo to help the newly installed capacity to be connected to regional interconnectors and/or reach national populations. As the solar plant being built in Liberia is very close to an existing sub-station, all grid connection related works will be covered under Component 1. In Chad, any works connected to enhancing the ability of the grid to integrate solar power will be undertaken under the existing Chad Energy Access Scale up Project (P174495). Activities under this component will increase access to renewable energy-based electricity. Each country has renewable energy targets, which will increase the share of low-carbon

[30] The land identified for the project is located within the following coordinate points P1 (191202.05, 1195527.11), P2 (191910.09, 1195535.13), P3 (191990.10, 1194542.12) and P4 (191206.11, 1194525.15).

electricity and reduce the share of high-carbon electricity being transported in the respective power systems. The RE targets and least-cost plans provide roadmaps for the future retirement of future fossil fuel plants and reducing GHG emissions.[31] The distribution infrastructure design and construction will include climate change adaptation measures, to ensure the infrastructure is resilient or avoids climate hazards and risks.

(a) *Sub-Component 3A: 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 in Sierra Leone (US$6 million).* This sub-component will finance the works associated with increasing the wheeling capacity of the existing 161 kV transmission line from 70 MW to 90 MW. The 161 kV line is around 205 km long which results in a high impedance that induces voltage drop along this line, especially during peak demand operations; this significantly impacts both the power transfer and voltage profiles in Freetown. The planned solar PV plant at Newton will evacuate part of its generation to the 161 kV transmission line and also use 33 kV sub-transmission line that is being built under World Bank-financed Sierra Leone Electricity Sector Utility Reform Project (P120304). This sub-component will cover the cost of design, procurement, and installation of devices for voltage regulation and increasing the evacuation capacity of the line such as, reactive power compensation (capacitor banks) and/or shunt reactors, and the 33kV and 11kV distribution lines needed to optimize the use of the solar plant. Increasing the 161kV line capacity will alleviate grid congestion and help in meeting the rapidly growing demand in Western Areas.

(b) *Sub-Component 3B: Support extension and densification of distribution grid in Togo with climate resilient grid infrastructure (US$9.5 million equivalent IDA):* This component will support elements of the government's PURS project that aims to increase access in the norther areas. Preliminary plans are for the RESPITE project to electrify 61 localities in the northern zone of Togo through the construction of 166 km of medium voltage lines, 151 km of low voltage lines, 61 transformer stations to meet an estimated power demand of 4,465 kVA. The project also plans to install 1,963 streetlamps for public lighting and will connect just over 12,100 households. The project will invest in climate resilient grid infrastructure through appropriate siting and design of the equipment. Solid concrete poles will be used where appropriate and adequate foundations will be used in areas with flooding risk to mitigate the risk to infrastructure damage or failure. The activity will also use, as needed, deep anchors or beams around distribution poles. It will also use specific standards, under development by CEET (the Togolese utility), to mitigate extreme weather effects (wind, extreme temperature) to increase the resilience of all the distribution lines in the component. RESPITE will also prioritize vulnerable, female-headed households when selecting households for connections.

56. **Component 4: Regional Coordination, Institutional Strengthening, and Implementation Support**

[31] RESPITE will contribute to: (i) Togo: 50 percent of RE 2025 target as documented in Togo's Master Plan for Generation, Transmission, Distribution of electricity (*Plan Directeur Production, Transport, distribution de l'énergie électrique au Togo*, PDPTD) 2021; (ii) Chad: supporting the 25 percent RE target by 2030 based on Master Plan for development of Renewable energies in Chad – 2018; (iii) Liberia: According to Liberia Intended Nationally Determined Contributions (INDC) commitments, the country aims for 100 MW RE installed by 2030; RESPITE will enable 60 percent of RE target (increasing RE generation mix from 88 MW to 120 MW in the next 10 years) (Liberia NDC p.13); (iv) Sierra Leone: reaching 180 MW solar target by 2030 in base scenario i.e., increasing from 2 percent to 20 percent solar energy based on Integrated Resource Plan 2020-2040 published in 2020.

(US$50.5 million equivalent IDA).

(a) *Sub-Component 4A: Regional Integration and Technical Assistance (RITA) to WAPP (US$20 million):* This sub-component will continue support for activities that commenced under Component 2 of the WAPP APL4 (Phase 1) – Côte D'Ivoire, Sierra Leone, Liberia, and Guinea Power System Re-Development Project (WAPP-CLSG Project, P113266) when financing under that project closes, namely: (i) finalization and operationalization of the legal, regulatory and technical frameworks to enable efficient regional trade between WAPP countries including for the CLSG Interconnection and the North Core Interconnection; (ii) technical integration of the WAPP network by improving the synchronous operation and reliability of interconnectors; (iii) preparation of priority regional projects as per the WAPP Master Plan 2018[32] including preparatory studies[33] for the solar PV project on Mt Coffee Island (*Sub-Component 1A*) and the MCHPP extension (*Component 2*), the Saint Paul 2 HPP, the WAPP Ghana-Burkina-Mali interconnection and the WAPP Median interconnection; and (iv) strengthening of the institutional and technical capacity of the WAPP Secretariat to undertake its regional mandate. Deeper regional integration of the WAPP power systems will in turn increase RE integration, GHG reduction and provide more climate resilience decision making options. This activity will be ringfenced from the other components of the project as it has its own separate implementation entity.

(b) *Sub-Component 4B: Regional Coordination & Institutional Strengthening (US$5 million)*: This component will finance the establishment and operation of the Regional Technical Committee (RTC) and the RCU as specified in the implementation framework (See detail in Section III.A) and conclusion of the Service Agreement, as well as TA, training, and operating cost. The RTC will provide a platform for all countries to share knowledge, coordinate to make collective decisions where required and provide overall guidance. The RCU will be responsible for overall quality assurance, coordination, and reporting for the project. This TA will be managed by the RCU and build technical capacity across all Project Implementation Units (PIUs) as there is extremely limited capacity within PIUs on the procurement and operation and maintenance of grid connected solar PV plants. Additional activities will be designed in consultation with other regional projects and organizations to ensure complementarity. Further, the sub-component will support activities to curate knowledge, including (i) the preparation of standardized procurement documents and institutional frameworks for public procurement of solar that can be used to rapidly deploy solar and BESS in a country facing a crisis, and (ii) holding workshops and trainings to disseminate the information. The RCU will work with regional bodies such as WAPP to ensure this knowledge is curated. Each participating country will provide a contribution towards supporting the RCU based on their overall allocation for the project[34].

(c) *Sub-Component 4C: Implementation Support to National PIUs (US$19.5 million):* The sub-component will focus on supporting the national PIUs in the implementation of the project. Each country's PIU will be responsible for managing this sub-component. This sub-component will help countries in the procurement of supervisory engineer(s) and preparation of any E&S

[32] ECOWAS Master Plan for the development of regional power generation and transmission infrastructure (2019-2033).

[33] Preparatory studies include technical feasibility studies as well as E&S studies. See Annex 4 for further details.

[34] Contributions are as follows: US$1.45 million from Liberia, US$1.37 million from Sierra Leone, US$1.09 million from Chad, and US$1.09 million from Togo. As the RCU and the PoE will be established before RESPITE effectiveness, the existing Liberia PIU is expected to incur about US$300,000 in expenditures related to these two entities. This expenditure is also divided among the four countries in the same ratio as their project allocations. Consequently, Liberia's share towards the RCU budget will be reduced by US$201,031 which is roughly equivalent to the share of other three countries in the US$300,000.

instruments that might be required; it will also help countries fund PIU staff and operations. Each country's PIU will have designated funds based on support activities that need to be carried out. The allocation across countries for this sub-component is: US$6.05 million for Liberia (*Sub-component 4C(i)*), US$4.13 million for Sierra Leone (*Sub-component 4C(ii)*), US$4.41 million for Chad (*Sub-component 4C(iii)*), and US$4.91 million for Togo (*Sub-component 4C(iv)*).

(d) *Sub-Component 4D: Technical Assistance for establishment of river basin management agency and preparation of new hydro projects in Liberia (US$6 million):* This sub-component will support Liberia in establishing a river basin management agency, which will be responsible for managing the entire cascade of hydro projects, including watershed and biodiversity management, and provide technical support to the operations and capacity building of the agency. This component will also support preparation of new hydro projects in the country, including through operating cost and training.

57. **Given the emergency nature of the project, a number of steps have already been taken to ensure timely implementation**. While project preparation is underway, countries are already moving ahead to ensure that, at the time of Board approval, they are well placed to begin implementation. All PIUs from the four participating countries have agreed, in principle, to the implementation and procurement arrangements at a joint meeting held in September 2022. A soft market sounding was also conducted to solicit feedback from the contracts/suppliers on the proposed project design and collect their concerns. A general procurement notice for all solar PV, BESS, and hydro sub-projects has been issued. An MoU defining these arrangements was shared with the countries; feedback was received from all countries and the revised MoU was signed on November 21, 2022. The ToRs for the PoE are ready and the experts are being hired. At the national level, Liberia and Sierra Leone have already secured the land, completed all feasibility studies, and are working on preparing the bid documents for their activities under Components 1 and 3. The necessary E&S risk management instruments required under the Environmental and Social Framework (ESF) for both countries are under preparation. In Chad, the land has been identified and the feasibility and grid integration studies are underway with completion expected by early next year. Once these have been completed the national PIU will work with the PoE to prepare the bid documents. Along bid preparation, the ESF instruments (Environmental and Social Impact Assessment [ESIA]/ Environmental and Social Management Plan [ESMP] etc.) will also be prepared as needed. In Togo, the land has been identified and the E&S impact studies are expected to be completed by end of December 2022 and the feasibility study will be ready by February 2023. Both Chad and Togo should be ready to participate in Package II procurement by March 2023.

C. Project Beneficiaries

58. **Direct project beneficiaries include all existing and prospective electricity customers in the four participating countries – Liberia, Sierra Leone, Chad, and Togo**. In all four countries the new renewable additions under the project offer a cleaner and more affordable alternative to existing fuel-based generation, making the grid more reliable and resilient in the face of fluctuating oil prices.

59. **In Liberia, the project will increase the supply of clean, sustainable, and affordable electricity during the dry season running from January to May**. The increased supply of solar power will fill a part of the gap left by the seasonal dip experienced during the dry season at the 88 MW capacity MCHPP. Large social and

economic benefits will accrue to households and businesses as they receive more reliable electricity. The addition of both hydro and solar capacity, identified as least cost generation options for Liberia, will help the country meet the expected 10 percent annual increase in power demand, improve reliable supply year-round and provide an affordable supply of electricity. With oil prices expected to be high in the foreseeable future, the project will help the country limit its use of liquid fuel fired thermal plants thereby reducing the fiscal impact significantly. The project will also help integrate Liberia further into the WAPP as it supports the completion of the solar project that is already part of the WAPP masterplan.

60. **In Sierra Leone, the project will offer a much more affordable and cleaner alternative to the existing HFO based generation**. The two solar power plants will increase the installed capacity in the country by nearly 60 percent during the dry season, when Bumbuna hydro is limited to about 5MW, going a long way in improving power supply during that time of the year. Households and businesses suffering widespread blackouts will benefit from more reliable electricity. The rest of the year when Bumbuna has a higher capacity, the two solar power plants will directly replace the HFO based generation. This will relieve financial pressure on EDSA, the distribution utility, that is unable to meet its power purchase costs as oil prices have crossed the US$100/barrel mark. With an improved financial condition, EDSA can allocate funds for much needed investments in the network. The government will see a reduction in fiscal pressures as it will avoid the payments it has been making to HFO based IPPs to fulfill EDSA's obligations. Reduced costs of electricity purchase will also help reduce the government's subsidy bill for end user tariffs. The grid related works in the project will help alleviate the grid congestion and allow for better integration of the CLSG interconnector into the national grid, preparing the grid for the future.

61. **In Chad, the project will help increase renewable generation in the power mix, lowering the average costs of grid-connected electricity supply in the country**. Availability of cheaper electricity will help improve the financial situation of SNE, directly lowering the subsidies otherwise required. This is because, RESPITE's cost to Chad will be very marginal (limited to O&M costs beyond the initial one to three years funded by the project) and considerably below the effective realized tariff, and hence generate a net revenue surplus that can be used to lower the subsidy that is currently required. This in turn could also enable greater allocation of resources to other social needs such as education, health, or food. Thus, other social and economic benefits can accrue to Chadians apart from the direct benefit of getting more reliable and affordable supply. With a very low access rate, improved financial viability of SNE could also have a positive impact on SNE being able to finance some of the grid expansion needs and help increase access. With the successful implementation of the country's first solar power plant through this project, the private sector will get the confidence to enter the sector on its own to develop the significant solar potential in the country.

62. **The project will increase access to electricity and provide reliable power supply for the population living in the northern Savanes region in Togo**. The solar power plant will replace the existing expensive diesel-powered plants, providing the region with more affordable and cleaner options for power supply. The substantial grid works planned will also increase access for a large part of the population living in 59 localities of the region. The project will lower the cost of electricity for the utility leading to reduction in the subsidy provided and possibly the end user tariffs themselves. These are direct financial benefits for the public as well as the government that can then divert resources to other social services. Another direct benefit of the project is to improve the security situation in the country as supply of electricity services improves in the region. In addition, the project will be leveraged to close identified gender gaps in Togo by

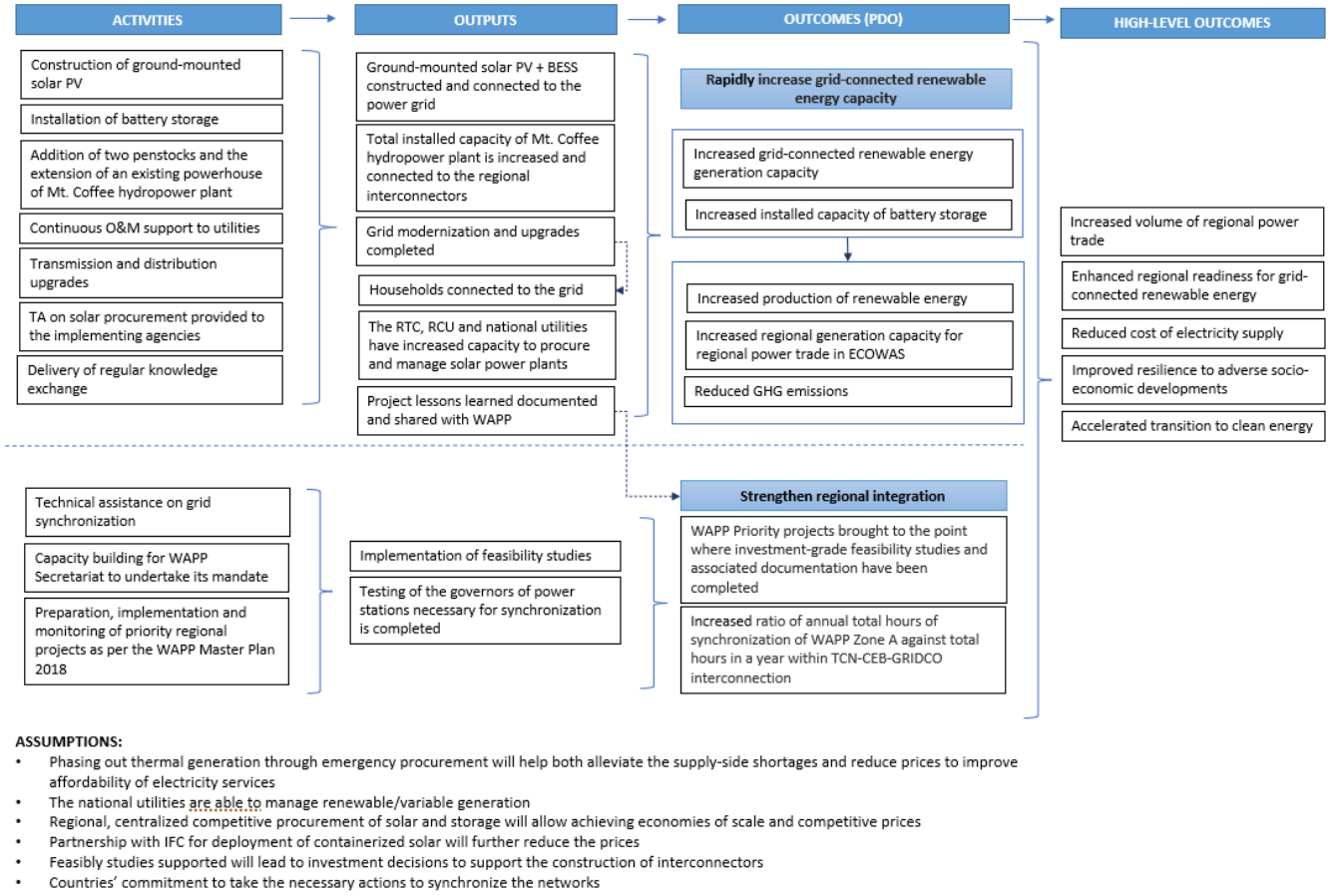
reducing the disparity in access to electricity of poorer urban households and in particular of those that are female-headed possibly through pro-poor mechanisms as well as targeted communication campaigns that help alleviate their lower access to information. Indicators will track progress towards reduced disparity of household electricity access to achieve that 27 percent of household electricity connections are for female-headed households, which reflects their average prevalence in the country.

63. **The project will also lead to substantial reduction of GHG emission in the four countries as they reduce liquid fuel generation and increase cleaner and more affordable solar**. For each country, depending on the individual project sub-component, there are substantial benefits for present electricity users as they receive more reliable electricity supply while in some countries people without access get access to electricity. However, there is a large benefit that can be observed across the four countries, namely a reduction in GHG emissions as countries move away from the polluting liquid-based generation to cleaner sources of electricity. The analysis carried out for this project shows that the overall expected aggregate reduction in GHG emissions is estimated at 10-14 Mtons CO_2e over the economic lifetime of the various investments funded by the project.

D. Results Chain

64. **The Ukraine war and resulting oil price rise is leading to massive fiscal impact for the region given its dependence on thermal-based generation.** This exacerbates the shortage of energy supply, creating power sector crisis and increasing the risk of instability in the region. The regional vulnerability to civil unrest due to shortage of energy supply requires emergency investment in renewable generation and storage solutions. Not only will increased generation of renewable energy contribute to reduced risk of civil unrest and man-made disaster, reduce the GHG emissions and thermal power consumption, but also it will result in additional benefits, including increased volume of regional power trade, reduced cost of electricity supply and accelerated energy transition. Grid modernization and distribution expansion to ensure effective penetration of variable solar generation will be a key component of the project. Moreover, the project will facilitate regional interconnection by supporting WAPP with TA on grid synchronization and preparation of priority regional projects. Four important conditions are necessary for the sustainability of the project results: (a) centralized procurement and knowledge exchange platform; (b) the partnership with IFC for deployment of containerized solar which will further reduce electricity prices; (c) countries' investment decisions to support construction of interconnectors; and d) enabling environment to facilitate sustainable provision of greener supply of electricity.

Figure 5. Theory of Change



ASSUMPTIONS:

- Phasing out thermal generation through emergency procurement will help both alleviate the supply-side shortages and reduce prices to improve affordability of electricity services
- The national utilities are able to manage renewable/variable generation
- Regional, centralized competitive procurement of solar and storage will allow achieving economies of scale and competitive prices
- Partnership with IFC for deployment of containerized solar will further reduce the prices
- Feasibly studies supported will lead to investment decisions to support the construction of interconnectors
- Countries' commitment to take the necessary actions to synchronize the networks

E. Rationale for World Bank Involvement and Role of Partners

65. **A standalone regional IPF is identified as the most relevant instrument for the proposed project**. The RESPITE project was conceptualized as a one-time emergency support for the provision of clean renewable energy supply to the countries as quickly as possible. It is critical that the project is not seen as a move by the WBG to eschew private development of solar power for public funded renewable. The intention is to use RESPITE only in an emergency situation where the private sector is unable to provide a quick and appropriate solution. Thus, the selection of a one-time emergency standalone IPF as the instrument was deemed appropriate.

66. **Emergency support for grid connected solar PV infrastructure and associated works requires public resources given the absence of any private sector presence or low interest in the sector in these countries**. Among the four countries that are part of RESPITE, the private sector is involved in the development of renewables only in Togo. Sierra Leone, Liberia and Chad have tried to attract the private sector to build solar IPPs, but no project has achieved financial close to date. Given the present poor financial situation of the utilities in the participating countries, the off-taker risk is too high for the private sector to be willing to develop renewable projects in these countries. In the absence of private sector solutions that singularly meet the demand for these countries, a coordinated approach with IFC is being

proposed that uses the private sector and guarantee instruments where feasible and public funding where it makes the most sense. The emphasis is to present the countries with the most suitable options to address a critical supply shortage situation and improve their fiscal stress.

67. **Countries have very limited resources to deal with crisis and the World Bank is well placed to offer them immediate support.** The Ukraine war and the consequent rise in oil prices has increased the liabilities of distribution utilities in the countries, who are unable to pay for their power purchases and in turn are requesting government support to ensure continuity of electricity supply. These countries, already dealing with an impending food crisis due to the war in Ukraine, have no fiscal space to support the rising power purchase costs and are facing an acute power supply crisis (frequent outages, widespread blackouts) that threatens to upend their economic growth and lead to civil strife.

68. **Publicly funded emergency support will help alleviate electricity supply crisis faced by the countries while establishing an enabling framework for private sector to enter the market.** The proposed RESPITE platform is meant to intervene only in an emergency and not replace private sector led renewable expansion. The RESPITE intervention will not only provide a benchmark for technology, pricing and best practices for grid scale solar deployment, but also build technical capacity in the government and sector utilities to manage solar power. The grid connected works associated with the project will also provide the necessary infrastructure to allow for more renewables to be integrated in the system. It should be noted that close collaboration between IFC and the World Bank has ensued for the preparation of RESPITE as IFC supported Release program – offering the PSW liquidity support facility to deploy containerized solar – has plans to deploy solar in Chad and eventually Liberia, and Scaling Solar is developing a project in Togo. Therefore, coordination focuses on ensuring there are no technical constraints (land availability, absorption or wheeling capacity of networks) with the different interventions advancing in parallel over the coming years. In Chad specifically, the World Bank and IFC are jointly presenting a comprehensive package of support to the government to help close the supply gap of almost 100MW. Overall, public support under RESPITE helps utilities of participating countries (i) to become a more viable off-takers by reducing subsidies to the sector and (ii) institutionalize procurement and improve absorption capacity of the grid for future deployment of solar through private sector.

69. **The proposed project builds upon long-term and unique experience of the World Bank in building infrastructure to address issues at the regional level**. The value add of the World Bank comes from its ability to provide a comprehensive solution, in coordination with IFC, to address the electricity supply challenges and related fiscal stress being experienced in the region. At the same time, it will augment the regional integration efforts, especially with interventions in Liberia and Sierra Leone linked to the existing CLSG interconnector and support to synchronization efforts of WAPP. RESPITE will address the immediate crisis ensuring that the long-term engagement continues to focus on the strategic goals. The World Bank also has extensive experience of creating an enabling environment for the private sector through securitization of payments and commercial framework undertaken under the West and Central Africa Energy Trade DPF (P171225).

F. Lessons Learned and Reflected in the Project Design

70. Given the long history of support for regional interventions at the World Bank, the project benefitted immensely by incorporating the lessons learnt from these past projects in the design of this project.

71. **The need for a quick response requires that the implementation framework is simple, flexible, and tailored to the circumstances of each country**. The experience from the past regional projects underlines the importance of an implementation model that is comprehensive and designed around the individual context of the participating countries and the context of the issue that is being addressed as well. Centralized institutional models that include the setting up of a temporary regional entity (Special Purpose Vehicle or a regional PIU) that develops and operates the regional infrastructure is appropriate for a more integrated regional market and a project that includes infrastructure across national borders. This is not the case for RESPITE. Setting up a regional entity would require a legal and regulatory framework that is agreed upon by all participating countries. Experience in other World Bank-financed projects shows that this can take a long time to achieve – anywhere between one to three years. For emergency support, the emphasis is on implementation frameworks that are quick to set up. Another possible approach is to use an existing regional entity such as ECOWAS, WAPP or ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREE) to implement the project. However, for RESPITE participating countries, one of the issues is that Chad is not part of ECOWAS and so any project that involves the country needs special approval that take significant time to obtain. Additionally, the three regional entities mentioned above are all involved in various regional interventions and their capacity has been quite stretched, putting into question their ability to manage another regional project. Thus, implementation arrangements that leverage existing national PIUs and establish a RESPITE coordination unit in one of the participating countries have been designed. This approach offers several advantages: (i) the use of national PIUs for the infrastructure works within each country's boundary will allow for countries to have a higher ownership of the power plants; (ii) using an established PIU, with addition of staff where needed, will help save time during implementation and use existing expertise in the country; and (iii) capacity building at the national PIUs will help countries to use the knowledge gained in future expansion of solar power.

72. **For the World Bank to respond quickly to the crisis, rapidly advancing the preparation of key technical studies, ESF assessments and major procurement packages is required.** Technical studies, E&S risk management instruments, and BDs are already at a very advanced stage in Liberia. Sierra Leona has completed the technical assessments and has commenced the preparation of BDs and E&S risk management instruments. Chad and Togo have begun the necessary technical studies and aim to complete them by the time the project is approved or shortly thereafter; the studies and assessments for Liberia hydro will also be delivered after project approval. A dedicated Hands-on Enhanced Implementation Support (HEIS) team is supporting the centralized procurement for the four countries as it will (i) allow for a quicker and more efficient bidding process; (ii) overcome lack of technical capacity at the national PIUs when it comes to solar procurement; and (iii) allow for signaling to the market that a larger envelope of aggregated capacity needs will be tendered - in effect creating economies of scale. Given the need to move forward without delay in Liberia and Sierra Leone, the procurement process of the DSI and O&M contracts in Liberia and Sierra Leone will commence as soon as possible. It should be noted that, while there will be two solar PV and BESS packages, a General Procurement Notice (GPN) has been issued for the sum of capacity needs across all four countries and therefore should not minimize economies of scale.

73. **Strong political commitment is essential for the project to advance.** Political support at the highest level was sought and received in the participating countries. Once the highest political leadership puts its weight behind the project, systems in individual countries begin to move forward. Getting buy-in at all levels (utility, line ministry, attorney generals, etc.) was also essential to ensure that issues are addressed quickly

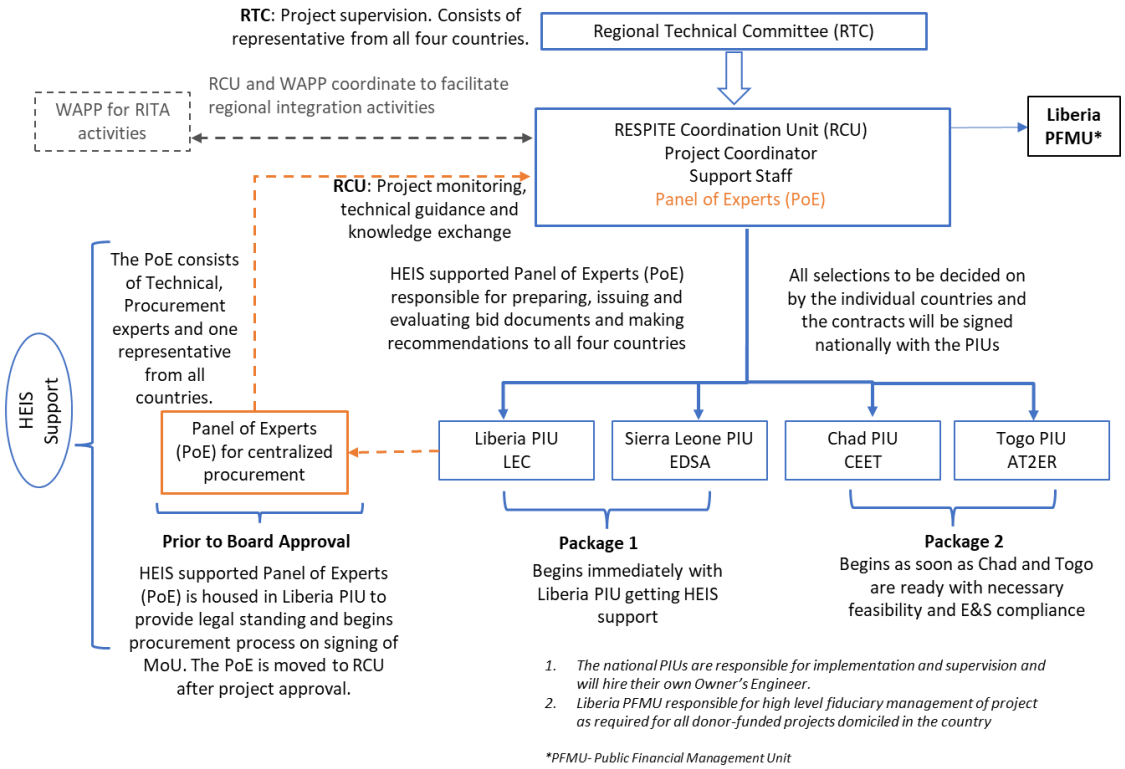
and project preparation advances expeditiously.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

74. **LEC, EDSA, SNE, and 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 20 MWp 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 (52 MWp and 28 MWh BESS) with 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 with BESS 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 25 MWp power plant with 40 MWh BESS and extension and densification of distribution grid. All works contracts under the various components will be signed by the National Governments through the PIUs.

Figure 6. RESPITE Institutional Arrangements



75. **An 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 Director Generals (DGs) of the utilities or alternative individuals nominated by the country will be

established before project effectiveness. The RTC will be the platform for bringing alignment among the four countries on all issues especially with respect to the operating and coordination modalities, and the hiring of the PoE and RCU staff, among other aspects. The RTC will meet each quarter for the duration of the project. The RTC will also 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 will also ensure inter-agency coordination and cooperation, as well as reporting to line ministries in each country.

76. **An 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 (M&E), 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 PoE who will be responsible for supporting the procurement of activities specified under components 1 and 2A including solar PV, BESS, and associated grid connection works (see details below). The RCU will consist of a project coordinator, a procurement specialist, a financial management specialist, an environmental specialist, a social specialist, a gender-based violence consultant, a support staff, and any other staff deemed necessary for effective discharge of its duties. The RCU will also be responsible for providing TA to the national PIUs during the project. It was agreed that the RCU will be established before effectiveness and be domiciled in Liberia (separate from the national PIU) to ensure timely implementation of project. Instead of going through the process of setting up a regional entity, which would require approved decrees in each of the four countries and lead to delays, a national body is being leveraged for RESPITE as opposed to a regional one. Liberia[35] was selected as it has resources available to begin procurement activities ahead of approval of RESPITE. Lastly, basing RCU in Liberia will keep the RCU close to implementation of sub-projects for proper oversight and coordination.

77. **Existing National PIUs at LEC, EDSA, SNE, and AT2ER will implement relevant sub-projects, provided they will have adequate resources and technical capacity**. Three of the four implementing entities have existing PIUs, most with experience implementing World Bank projects. The main purpose for using existing PIUs is to leverage the existing expertise within these PIUs given that they have been working with the World Bank on the existing portfolios. This will save both time and resources that would have been used in setting up new PIUs. AT2ER does not have an existing PIU but has experience of implementing various projects for other Development Financial Institutions. However, the team will ensure that the PIUs have requisite capacity, especially related to new technical needs and E&S risk management and monitoring, during the implementation of RESPITE. This is especially true for those PIUs having the bulk of their experience implementing the World Bank's Operational Policies as opposed to the current ESF. The project proposes to keep the existing structures of these PIUs, complementing them with additional resources if needed. As described below, World Bank HEIS will also be available to support the national PIUs implement the sub-projects, and the national PIUs will be responsible for procuring supervision engineers to support implementation.

[35] The RCU will be domiciled in Liberia, housed within LEC. The RCU would be established as a separate unit from the existing PIU implementing World Bank-funded projects (which throughout this document is referred to as the "national PIU" for Liberia). The sole focus of the RCU is to coordinate the implementation of RESPITE as described in the main text. It should be noted that the performance of the Liberia PIU has been rated satisfactory in most recent project (P173416). Similarly, the RCU will receive extensive support through HEIS to ensure sufficient capacity is dedicated to the success of the project.

78. **The WAPP Secretariat will implement Component 4A (RITA) which includes TA activities**. This is a continuation of the successful implementation arrangements for Component 2 of the WAPP-CLSG Interconnector Project, which is implemented by a WAPP team, led by a coordinator (see annex for details). The WAPP implementation team for RITA 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 even outside of RESPITE. The Financial Management (FM) and procurement arrangements for the activities under this sub-component will continue to be carried out as approved for the existing arrangements under the WAPP APL4 (phase 1) - Côte d'Ivoire, Sierra Leone, Liberia, and Guinea power system re-development Project (P113266). As of the last disclosed Implementation Status and Results Report (May 2022) the overall rating for the project for FM was satisfactory and for procurement was moderately satisfactory. The safeguards rating was also satisfactory, although the project is under the safeguards Operational Policies.

79. **The RCU will sign individual Service Level Agreements (SLA) with each PIU that will define their roles and responsibilities with respect to each other.** The SLA will clearly outline the tasks that the RCU is expected to perform for the national PIUs specifically pertaining to centralized procurement. It will lay out the reporting mechanism for the national PIUs to the RCU. The SLA is not a commercial agreement as the RCU costs will be funded by the project for the centralized procurement that it will carry out. The signing of the SLA will be a condition for project effectiveness.

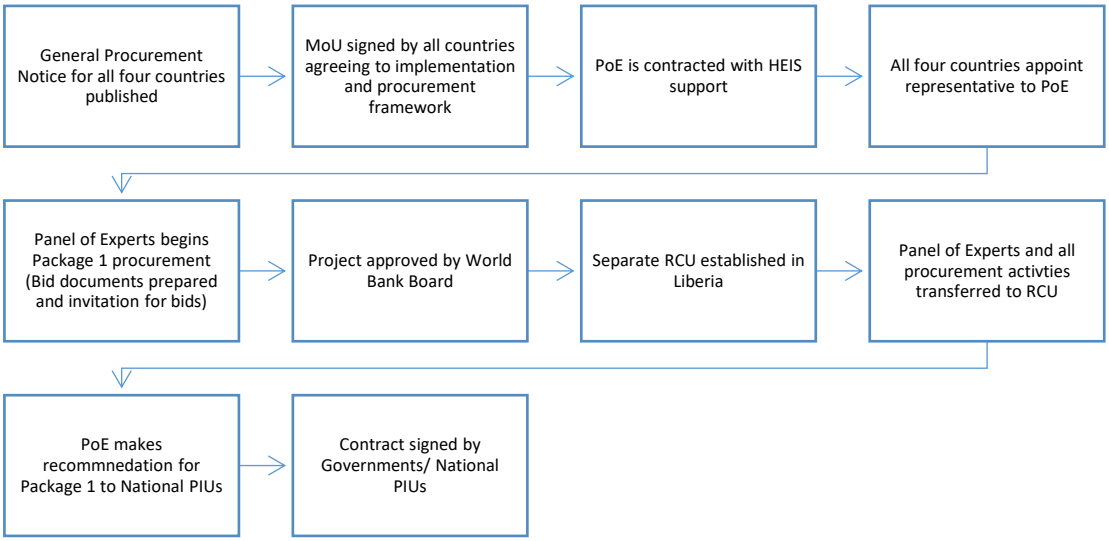
80. **The role of the PoE is critical to rapid project implementation, bringing down costs and attracting international private players**. The PoE will consist of one international procurement expert who will also head the PoE, at least two international experts (one for solar and one for T&D), and one support staff. Each country will also nominate at least one senior procurement specialist and up to two other technical experts (for solar and T&D) to participate in the procurement process (responding to bid questions, joining the evaluation committee, etc.). A GPN has been issued to signal to the market the total scope of works included in the project to attract larger international players. The PoE will be responsible for preparing bid documents, initiating the bid process, carrying out the evaluations and making recommendations to the relevant governments 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.

81. **The procurement for solar works will be carried out through a centralized approach that will provide flexibility to each country in moving at its preferred pace and yet help the project move forward quickly.** The countries have agreed to the procurement and implementation arrangements and signed an MoU. The PoE is being set up to commence procurement activities. As the countries are in various stages of project preparation, the PoE will carry out the procurement in three different packages. Package 1 will include the procurement of solar PV and battery storage in Liberia and Sierra Leone. Once Chad and Togo sub-projects have been fully prepared, they will be tendered in a second package of procurement activities under the project. While procurement for all solar and associated works will be done centrally, procurement for works under other components will be done at the national level. Additionally, the national implementing agency will be responsible for hiring the engineering firms for construction supervision and quality assurance. The third package will comprise of procurement of hydro activities for Liberia.

82. **Given the emergency nature and speed of response required to address the crisis in participating countries, the procurement process has begun before project approval**. As the MoU has been signed, the procurement process has commenced with the clients preparing the necessary E&S instruments, as mentioned in the ESCPs, and the institutional arrangements are being put in place. To ensure delays are minimized, the RTC will be immediately established alongside the advancement of other project preparation activities. The RTC will provide a platform for the countries to convene and align on the implementation framework and proposed procurement modalities. The PoE will also be selected immediately to advance procurement-related activities. The PoE will be housed at the Liberia PIU before RESPITE is effective and the PoE contracts will be moved to the RCU after effectiveness. This will ensure that the process moves forward as quickly as possible without delays and the project is able to provide the needed support within the timelines requested by the governments.

83. **The existing Liberia PIU is responsible for procurement related works before project approval with support from World Bank's HEIS**. To accelerate procurement the PIU for the LESSAP (P173416) will be tasked with initiating the process. For this purpose, the PIU, with World Bank's HEIS support and supervision, will recruit the individuals for the PoE. In addition, the PIU has already issued a GPN to signal to the market the entire scope of the Project and the overall solar PV and battery requirements for the four countries. Once the RCU has been established, it will take over the contracts of the PoE's experts and support staff. The Liberia PIU will be responsible for making payments to the PoE to initiate the process. This will involve preparing bid documents and initiating the invitation of bids process. As all this work is envisioned to be undertaken by the PoE on behalf of the national PIUs, the former will work closely with all countries during the procurement process through the national representatives in the PoE.

Figure 7. High level steps for RESPITE



84. **The World Bank will provide additional support to the PIUs and implementing agencies through HEIS.** Given the limited experience of procuring, installing and operating grid connected solar power plants in the participating countries, HEIS support was requested. It is proposed that the PoE will be supported extensively through HEIS in bid preparation, evaluation, and recommendation of awards. HEIS will also support the national PIUs in the selection of the national supervision engineers. Additionally, HEIS support

will be available to all PIUs through the project implementation period to provide both technical and procurement support for any related works. Procurement procedures under this institutional arrangement, by the LEC PIU initially and then by the RCU, will be undertaken in accordance with World Bank procurement guidelines. Also, according to the procurement plan defined below, complex in-kind procurement activities will benefit from HEIS support by the Bank.

85. **The table below indicates the components to be implemented by the respective implementation units.**

Table 3. Implementation of components by agency

Project Component	Implementation Unit
Sub-Component 1A, Component 2, Sub-Component 4C, Sub-Component 4D	LEC
Sub-Component 1B, Sub-Component 3A, Sub-Component 4C	EDSA
Sub-component 1C, Sub-Component 4C	SNE
Sub-Component 1D, Sub-Component 3B, Sub-Component 4C	AT2ER
Sub-Component 4B	Liberia-based RCU
Sub-Component 4A	WAPP

86. **The countries have shown their intent to move quickly within the institutional and implementation arrangements** for the project by signing a MoU. The MoU signed between the four participating countries lays out the institutional arrangements for RESPITE, the steps that need to be taken before the project is approved, and specific arrangements that will remain effective when it is under implementation. The specific roles and responsibilities assigned to various entities described above (RTC, RESPITE Coordination Unit, PoE and PIUs) are briefly discussed in the MoU. Each country will sign an individual Financing Agreement (FA) with the World Bank that will reference the MoU and SLA that will be signed between the RCU and the national PIU before effectiveness. The SLA will establish the relationship and nature of interactions between the RCU and the national PIUs.

87. **The SLA will specify the mechanism for each country to provide its share for the RCU budget.** As mentioned earlier each country will contribute its own share in proportion to the overall allocation. In its role to provide TA to the national PIUs (Chad, Togo, Sierra-Leone, and Liberia) and carry out centralized procurement during the project, the RCU will sign an SLA acceptable to the World Bank with each country clearly stating the activities to be conducted by the RCU and the cost per country (percentage of the overall cost). The RCU will open a project account, and the SLA will specify the replenishment mechanism. The role and responsibilities in funds management, disbursement process, accounting, reporting, and auditing will be detailed in the SLA and the RESPITE Operations Manual (ROM). To mitigate the risks of ineligible expenditures and the delay in FM report submission, a regional workshop will be organized after Board Review to agree on the financial management and reporting procedures ahead of project effectiveness.

B. Results Monitoring and Evaluation Arrangements

88. **The M&E framework will track progress in implementation and measure progress against the PDO and intermediate outcome indicators.** The Results Framework and M&E Plan outline the key performance indicators, data collection methods, data collection timeline, and responsible agencies. The Project Coordinator at the RCU will be responsible for (i) collecting quarterly progress reports from the national PIUs and the WAPP implementation team; (ii) verifying that the reports meet the requirements for the content and data sources (as outlined further in this paragraph); and (iii) submitting the quarterly progress

reports to the World Bank no later than 45 days after the end of each quarter. The quarterly reports prepared by the national PIUs will monitor (i) physical progress of works; (ii) progress towards the achievement of the milestones and targets of the Results Framework indicators; and (iii) any issues affecting the project implementation and respective mitigation actions. The primary sources of data collection for the project implementation units will be the project implementation/completion reports for the development of power plants, installation of batteries, expansion of distribution networks, installation of equipment at substations, and provision of TA, submitted by the implementing entities. The reports will demonstrate that services were provided and/or the infrastructure is developed and functioning per the specifications outlined in the procurement documents. The national PIUs will also conduct physical verification visits to the project sites. Modelling data will be used to track the progress towards the PDO-level indicator "reduced GHG emissions". The assessment methodology and assumptions for the models are developed as part of the process of estimating the baselines and targets for these indicators and will be made available to the RCU, the national PIUs, and the WAPP implementation team. The SLA will define the reporting requirements of the national PIUs to be provided to the RCU. The PIUs in the four countries and in WAPP have the adequate M&E capacity and staffing to undertake the monitoring and reporting activities for RESPITE given their experience in ongoing energy sector projects (e.g., Liberia Renewable Energy Access Project (P149683); Enhancing Sierra Leone Energy Access (P171059); Cameroon – Chad Power Interconnection Project (P168185); Togo Energy Sector Support and Investment Project (P160377); WAPP-CLSG Project (P113266).

C. Sustainability

89. **The project design includes contracting O&M of the solar PV and storage plants for a period of up to four years to transfer knowledge to the national utilities and ensure the longevity of the plants**. While grid connected solar PV and storage are relatively well-known technologies, in absence of any experience of operating similar power plants, the project is proposing that the power plants are operated and maintained by a private contractor for a period of three to five years. During this period the private contractor will ensure that utility staff are trained and ready to operate the plant at the end of the contract period.

90. **RESPITE interventions are designed to address an immediate need but also function as a successful pilot for solar PV deployment in the participating countries**. The interventions will provide valuable experience to national utility staff in terms of development and O&M of solar PV and battery storage plants. The knowledge gained from this experience will help the countries deal with private players moving forward. Importantly, the grid related work that will be done during the project will help the grid become more resilient and ready for further renewable integration. Finally, the interventions will provide a benchmark for pricing that the countries can aim for future competitive procurement of solar PV. Thus, RESPITE will not only respond to the emergency but set the stage for further renewable expansion in these countries.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

Technical Analysis

91. **Overall, RESPITE activities are aligned with the least-cost power development plans of participating**

countries; Liberia sub-projects are featured in the WAPP master plan. The technical design of the project presents no construction or operational challenges as solar PV, BESS, and hydro turbine technologies are well understood. However, capacity for operation and maintenance of solar PV and battery storage in RESPITE countries is generally limited; therefore, the project ensures operational standards would be met through O&M contracts. While O&M contracts are in effect, capacity building will be provided to utilities to ensure sustainability of supply beyond the life of the project. All works would be preceded by the completion of feasibility studies; for the solar projects in Sierra Leone and Liberia as well as expansion of MCHPP, the feasibility assessments have been completed. The project introduces new implementation and procurement arrangements to ensure timely implementation and efficiency in costs. The proposed arrangements are based on the lessons learned from World Bank-financed regional projects in Africa West and technical standards will be harmonized with the practices of WAPP where relevant.

92. **The project in Liberia aims to deliver a 16 MWac solar PV plant and the expansion of the MCHPP.** The Solar PV plant with fixed tilt will be located in an area next to the MCHPP. The grid connection will be made to the 22 kV busbar of the MCHPP substation. The grid operation can accommodate the PV plant without the needs for BESS, but a replacement of the 66(132)/22kV transformer for the connection of plant power is required. The feasibility study has shown that the solar sub-project is technically sound and included a flooding analysis to determine the area that would not be flooded even under the worse conditions. In addition, geotechnical and topographic surveys have been carried out, as well as other desktop analysis. The plant is located in a site with a global horizontal irradiation (GHI) of 1,702 kWh/m^2 year (source: SolarGIS). The estimated yield at P50 was 1,462 kWh/kWp with a proposed capacity of 16 MWac/20 MWp.

93. **The project also aims to increase the total installed capacity of the MCHPP from the current 88 MW to 129 MW**. The expansion will involve making modifications to the existing dam and other appurtenant structures to accommodate two additional units each with in installed capacity of about 20.5 MW, making a total of six generating units. Two additional penstocks will be installed for the existing 5th and 6th intake bays after the removal of the concrete bulkheads. The existing powerhouse will be also extended to accommodate two additional turbines and their associated electromechanical components. The tailrace channel will also be extended for units 5 and 6. The evacuation of power from these additional units will be via the extension busbars in the existing substation but will require the replacement of the existing 66/22 kV 10 MVA in order to accommodate the 16 MWac solar PV plant co-located with the hydro plant. The feasibility studies carried out identified the project to be technically feasible. It utilized actual discharge data on the St. Paul River, daily rainfall data from a nearby station and operation data set from the existing MCHPP. It also makes use of existing topographical, bathymetrical, geotechnical, geophysical data collated from studies carried out during the rehabilitation of the MCHPP in 2016. The studies duly considered options to reduce the impact on the operation of the existing four units of MCHPP and confirmed the extension will not require the flooding of any areas as the current full supply level of 29 meters above sea level (masl) will not be exceeded.

94. **The project in Sierra Leone aims to deliver two plants: expand the existing PV plant at Newton from 5 MWac to 35 MWac and a second PV plant in Lungi of 10 MWac**. The grid connection of the Newtown site will be made through three configurations: 11 kV (Waterloo), 33 kV (line towards Jui) and to the existing 161 kV line. For the Lungi power plant, the connection will be through the 11 kV busbar of Lungi substation, 3.6 km away from the Lungi PV plant. A BESS of 15 MVa/15MWh and 6MVa/6MWh is being proposed for the new plants in Newton and Lungi respectively. Additionally, 7MVa/7MWh BESS will be added to the

existing solar plant at Newton. The feasibility study has shown that both PV plants are technically sound including geotechnical and topographic surveys. The Newton PV plant is located in a site with a GHI of 1,799 kWh/m^2/year and the Lungi PV plant with 1865 kWh/m^2/year (source: SolarGIS). The estimated yield at P50 was 1468 kWh/kWp with a proposed capacity of 30MWac/39MWp and of 1525 kWh/kWp with a proposed capacity of 10MWac/13MWp.

95. **The project in Chad aims at installing a 30 MWac PV plant with substantial BESS energy capacity**. The feasibility study has not been carried out yet but is expected to start shortly, while the site for the construction has been provided officially by the government at this stage.

96. **Similarly, the project in Togo aims at installing a 25 MWp PV plant with 40MWh of BESS**. The government has done a pre-feasibility study for this site and shared with the Bank. A feasibility study and a grid integration study are underway for the site.

Economic Analysis

97. **An economic analysis was carried out to assess the development impact of the project in terms of expected economic benefits and costs over the lifetime of the assets funded by the project.** The economic analysis is consistent with the new World Bank guidelines on economic analysis and relies on a standard cost-benefit framework which compares the present value of incurred costs to the stream of attributable benefits under two scenarios, i.e., the "with project" and "without project" scenario. The main decision-making criteria of the economic viability of the project are the Economic Internal Rate of Return (EIRR) and Net Present Value (NPV), with the project deemed economically viable if the EIRR is greater than the discount rate and the NPV is positive. To present all costs and benefits at a common point in time, the economic analysis relies on a real social discount rate of 6 percent.

98. **The project is also expected to bring some benefits from reduced GHG emissions.** In addition to the quantifiable benefits, the economic analysis also considers the additional benefit derived from reduced GHG emissions. The impact of the project on GHG emissions is calculated as the difference between the emissions associated with the level of service proposed by the project compared to the emissions associated with current alternatives under "without project" scenario. The analysis is undertaken in accordance with the World Bank GHG Accounting Methodology for Energy Access Investment Operations and National Renewable Energy Lab (NREL)'s updated estimates of Life Cycle Greenhouse Gas Emissions from Electricity Generation. The reduction in GHG emissions is expected as the project will shift the generation mix for the grid towards a higher renewable share compared to the current situation with the investments being in line with results of least-cost generation and expansion modelling undertaken for the countries.

99. **The project is beneficial irrespective as to whether it displaces thermal generation or meets latent demand for grid electricity with the latter having recently increased as a direct result of high fuel prices.** The overall net benefit of the project will depend on the share of the newly added renewable generation that will displace existing thermal generation, and the share of the newly added renewable generation that will meet latent demand for grid electricity (i.e., load that the power system is unable to serve with current grid-connected generation capacity either because there is insufficient generation capacity or the cost of thermal generation became unaffordable to the countries resulting in increased amounts of load shedding

and increased amount of unserved demand), with these shares summing to one. With rising cost of thermal generation, the utilities and the governments have been finding it more difficult to meet demand and pay for even more expensive thermal generation. For example, in Sierra Leone, the actual generation observed between January and June 2022 was more than 20 percent lower than the contractual generation from Karpower resulting in significant amounts of load shedding. The situation is not different for Chad, where petroleum is the primary source of public revenue and SNE currently recovers only about 50 percent of its costs resulting in high dependence on subsidies. SNE has been unable to meet its payment obligations to IPPs, leading to one of the three to leave increasing unserved demand in Chad. The economic analysis shows that the project is beneficial irrespective as to whether it displaces thermal generation or meets latent demand for grid electricity.

100. **The economic analysis shows that the project is economically viable under both of the considered scenarios, even without any consideration of environmental externalities.** Under Scenario 1, whereby the project displaces existing and/or future thermal generation that could otherwise be developed, the baseline NPV of the project is estimated at US$335 million and EIRR at 16 percent. Furthermore, when considering the impact of the project on reduction of CO_2 emissions, the net benefits increase to between US$568 million and US$801 million, depending on the assumptions around the social cost of carbon. Under Scenario 2, whereby the project is meeting latent demand for grid electricity, the baseline NPV of the project is estimated at US$557 million and EIRR at 21 percent. Furthermore, when considering the impact of the project on reduction of CO_2 emissions, the net benefits increase to between US$876 million and US$1,196 million under the second scenario.

101. **A summary of the project economic analysis is provided below, with all monetary values presented in NPV terms (US$ discounted to year 2022)**. The relatively higher net benefit of the project under Scenario 2 is intuitive, as (i) increased reliance on diesel self-generation has higher associated costs compared to grid-based thermal generation and Willingness to Pay (WTP) for electricity tends to also be higher than avoided fuel costs of grid-connected thermal generation; and (ii) using inefficient alternatives to electricity as well as small diesel generators is more polluting compared to grid-based thermal generation. In practice, the project's actual impact is likely to be somewhere between these two extreme scenarios (i.e., the project fully displacing thermal generation and the project fully meeting latent for grid electricity). Further detail containing analysis for each country including an analysis of the project's impact on each utility is provided in the Annex.

Table 4. Summary of Project economic analysis

		Scenario 1 - displacing thermal generation	Scenario 2 - meeting latent demand on the grid
Discount rate	[%]	6%	6%
EIRR	[%]	16.4%	21.4%
EIRR+GHG – World Bank Guidance Values (low)	[%]	21.9%	27.6%
EIRR+GHG – World Bank Guidance Values (high)	[%]	26.9%	33.3%
Total costs	**[US$M]**	**397**	**397**
Total benefits	**[US$M]**	**733**	**954**
NPV, before environmental benefits	**[US$M]**	**335**	**557**

		Scenario 1 - displacing thermal generation	Scenario 2 - meeting latent demand on the grid
Lifetime GHG emissions reduction (net impact)	**[MtCO2e]**	**-9.6**	**-13.0**
Net impact on GHG emissions evaluated at shadow price of carbon (low)	[US$M]	233	319
Net impact on GHG emissions evaluated at shadow price of carbon (high)	[US$M]	466	639
NPV (including environment, low)	**[US$M]**	**568**	**876**
NPV (including environment, high)	**[US$M]**	**801**	**1,196**

102. **The project is also expected to reduce the need for subsidies to the national power utilities that would otherwise be required in the four countries.** Under Scenario 1, whereby the project is assumed to be fully displacing the current and/or future thermal generation that could have otherwise been built, the impact on subsidies is estimated as the difference between the incremental costs to the country as a result of the project and avoided cost of thermal generation (i.e., avoided fuel costs and other avoided costs of thermal generation). Under Scenario 2, whereby the project meets latent demand for grid electricity, the impact on the need for subsidies to the national utility is calculated as the difference between the incremental costs to the country as a result of the project and the incremental tariff revenues as a result of additional power supplied. Ultimately, under both scenarios, the project is shown to reduce the need for subsidies across all the countries. The levelized cost of generation for the incremental generation was also calculated to compare its impact with and without the project. The results are summarized in the table below.

Table 5. Summary of the project impact on subsidies and incremental levelized generation costs by country[36]

	Scenario 1 - displacing thermal generation				Scenario 2 - meeting latent demand for grid electricity			
Country	**Average avoided annual subsidy for the first five years of the project lifetime (% of annual GDP)**	**Levelized incremental generation costs (USc/kWh)**			**Average avoided annual subsidy for the first 5 years of the project lifetime (% of annual GDP)**	**Incremental levelized generation costs (USc/kWh)**		
		Without the project *(incremental costs of thermal generation)*	**With the Project - total cost of incremental generation supplied by the project**	**With the Project - cost of incremental generation supplied by the project incurred by the country**		**Without the project** *(cost of alternatives to electricity and WTP for electricity)*	**With the project - total cost of incremental generation supplied by the Project**	**With the project - cost of incremental generation supplied by the project incurred by the country**
Liberia	0.4	13.9	6.0	6.0	0.4	22.5	6.0	6.0

[36] Under Scenario 2, whereby the project is meeting latent demand for grid electricity, under the 'Without Project' scenario, the cost arising due to insufficient supply in general (i.e., when demand cannot be met by grid connected generation) are valued at

	Scenario 1 - displacing thermal generation				Scenario 2 - meeting latent demand for grid electricity			
Country	**Average avoided annual subsidy for the first five years of the project lifetime (% of annual GDP)**	**Levelized incremental generation costs (USc/kWh)**			**Average avoided annual subsidy for the first 5 years of the project lifetime (% of annual GDP)**	**Incremental levelized generation costs (USc/kWh)**		
		Without the project *(incremental costs of thermal generation)*	**With the Project - total cost of incremental generation supplied by the project**	**With the Project - cost of incremental generation supplied by the project incurred by the country**		**Without the project** *(cost of alternatives to electricity and WTP for electricity)*	**With the project - total cost of incremental generation supplied by the Project**	**With the project - cost of incremental generation supplied by the project incurred by the country**
Togo	0.1	17.1	10.8	10.8	0.1	22.7	10.8	10.8
Sierra Leone	0.3	18.2	10.1	2.0	0.2	22.7	10.1	2.0
Chad	0.1	18.5	12.0	3.6	0.04	26.0	12.0	3.6
Project		**15.4**	**7.8**	**5.6**		**23.0**	**7.8**	**5.6**

Source: World Bank analysis

Financial Analysis

103. **A financial analysis of the impact of the proposed Project was assessed from the point of view of each of the national utilities in Liberia (LEC), Togo (CEET), Chad (SNE), and Sierra Leone (EDSA).** The financial analysis was conducted using a discounted cash flow approach assessing the expected revenues, O&M expenses, debt service and debt amortization cost, as well as any capital expenditures that would need to be incurred by the utility as a result of the project to calculate the financial NPV (FNPV), and financial internal rate of return (FIRR). As with the economic analysis, the financial analysis is confined to the project activities that generate quantifiable benefits for which a financial value can be clearly identified and measured. As at the time of the project preparation it was not clear whether any of the IDA credits provided as part of the project could be on-lent to the national utilities (only for Liberia and Togo, as for Chad and Sierra Leone the full envelope is a grant), to err on the conservative side, a scenario under which the credits are on-lent by the governments to the utility was also considered.

the cost of alternatives to using electricity or the WTP for electricity, depending on the type of consumer. We assume the non-residential share of demand would use alternative sources of electricity such as diesel self-generators if they could not get electricity from the grid. For residential consumers, they would use alternative sources of electricity and alternatives to electricity if they did not have access to electricity from the grid. Both of these alternatives are captured by households' WTP for grid-based electricity. We therefore value the benefit of the project under Scenario 2 at the avoided cost of diesel self-generators for the estimated non-residential share of demand and at the WTP for grid-based electricity for the estimated residential share of the demand. This approach is adopted to err on the conservative side, as it likely underestimates the expected net benefit of the project. This is because at times insufficient supply would result in unexpected interruption of electricity supply with considerably higher associated costs that is commonly valued at the value of lost load .

104. **The project is expected to bring positive cash flows to the national utilities across all of the four countries, thus considerably improving the financial situation of the utilities and reducing the need for subsidies from the state budget and/or the need for tariff increases.** Table below summarizes the results of the project financial analysis from the perspective of each national utility.

Table 6. Summary of project financial analysis

US$2022	Debt service and debt repayment (if any) stays with the government		Scenario under which the concessional loan (if any) is on-lend to the national utility	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Country	**FNPV ($m)**	**FNPV ($m)**	**FNPV ($m)**	**FNPV ($m)**
Liberia (LEC)	206	174	198	165
Togo (CEET)	96	79	86	69
Sierra Leone (EDSA)	112	76	112	76
Chad (SNE)	83	40	83	40
Total	**497**	**369**	**479**	**350**

B. Fiduciary

(i) Financial Management

105. An FM assessment of the national PIUs within each participating country and the WAPP Secretariat has been conducted (LEC, EDSA, SNE, AT2ER, WAPP) by the World Bank's FM team. The FM assessment was carried out in accordance with the FM Manual for World Bank IPF Operations that became effective on March 1, 2010, and was last revised on September 7, 2021. During its assessment, the World Bank's FM team consulted the various texts establishing the institutions in charge of implementing the project and reviewed the fiduciary arrangements of proposed implementing entities with experience managing IDA financing. The assessment also concluded that Project Financial Management Unit (PFMU) in Liberia will be responsible for FM aspects of the project. A review of the FM capacity of the entities involved in implementing the RESPITE identified inherent and control risks, for which the team developed corresponding mitigation measures. The overall FM risk of this project is **Substantial**. The proposed FM arrangements for this project are adequate to meet the Bank's minimum fiduciary requirements. The implementing entities comply with the World Bank's FM requirements, and there are no overdue audits and interim financial reports from these entities.

Table 7. FM Action Plan

Country	Actions	Due date	Responsible
Chad	Recruit a senior accountant fully dedicated to the project	Within three months of effectiveness	SNE
	Tailor current accounting system in use by SNE PIU under the Cameroon-Chad Power Interconnection Project (*Projet d'Interconnexion des Réseaux Electriques du Cameroun et du Tchad*, PIRECT, P168185) and Chad Energy Access Scale Up project (P1774495)	Within three months following effectiveness	
	Update the current FM manual in use for	Within three months following	

Country	Actions	Due date	Responsible
	the ongoing World Bank-financed project (Chad Access project)	effectiveness	
	Update the ToRs of the internal auditor recruited under the ongoing World Bank-financed projects (PIRECT, Chad Access Project) to include internal audit of the proposed project (RESPITE)	Within three months following effectiveness	
	Prepare and adopt ROM	Within two months after effectiveness	
	Update and adopt the SNE PIM	Within two months after effectiveness	
	Recruit an independent external auditor, with ToR and qualifications acceptable to the Association.	Within six months following effectiveness	
Liberia	Update the current accounting manual	Two months after effectiveness	
	PFMU to Customize the existing accounting software to include the account of the new project to generate the Interim Financial Reports (IFRs) and financial statement	Two months after effectiveness	LEC/PFMU
	Recruit external auditors	Six months after effectiveness	
	Update and adopt LEC PIM	Two months after effectiveness	
	Recruit FM officer	Two months after effectiveness	RCU
	Prepare and adopt ROM	Two months after effectiveness	LEC
Sierra Leone	Preparation of the PIM incorporating the FM policies and procedures	Two months after effectiveness	
	Prepare and adopt ROM	Within two months after effectiveness	EDSA
	Update and adopt the EDSA PIM	Within two months after effectiveness	
	Recruitment of FM Assistant	Three months after effectiveness	
	Recruitment of external auditor	Within six months after effectiveness	
	Agree on IFR format and audit ToRs	Done	
Togo	Update the FM manual of procedures used under African Development Bank (AfDB) financed projects managed by AT2ER	Three months after effectiveness	
	Recruit or appoint qualified and experienced FM officers, and Accountants		AT2ER
	Prepare and adopt ROM	Within two months after effectiveness	
	Update and adopt the AT2ER PIM	Within two months after effectiveness	
	Appoint within the current FM team of AT2ER, a qualified and experienced accountant to be dedicated to the new project	Three months after effectiveness	
	Include in the work plan of the current internal auditor the activities of the new	Three months after effectiveness	

Country	Actions	Due date	Responsible
	project		
	Customize the existing Tom2Pro accounting software to include the accounts of the new project to generate the IFRs and financial statement	Three months after effectiveness	
	Recruit an independent auditor to audit the project's financial statements	Six months after effectiveness	
WAPP	Update project software parameters for RESPITE	Three months after effectiveness	WAPP
	Recruit an independent auditor to audit the project's financial statements	Six months after effectiveness	
	Prepare and adopt the WAPP PIM	Within two months after effectiveness	

(ii) Procurement

106. **Procedures.** Procurement under the proposed project will be carried out in accordance with the World Bank "Procurement Regulations for Investment Project Financing Borrowers" dated November 2020, the "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants" dated October 15, 2006 and revised in January 2011 and as of July 1, 2016, and beneficiary disclosure requirements, as well as other provisions stipulated in the project Legal Agreements.

107. **Emergency and Project Procurement Strategy for Development (PPSD).** The project has triggered Paragraph 12, Section III of the World Bank IPF Policy concerning preparation of projects under emergency. Due to this, a PPSD and an initial procurement plan have been prepared, but both are to be updated during implementation stage based on the capacity and risk assessment of the proposed implementing agencies. Special arrangements like direct contracting, the use of State-Owned Enterprises, UN Agencies, local Non-Governmental Organizations (NGOs), HEIS, force account or civil servants needs and results-based arrangements may be used and are described in the PPSD. The PPSD also includes a summary on procurement risk, mitigation action plan, and procurement implementation support and supervision plan. The PPSD does not include the WAPP activities which will be included once it is revised post effectiveness.

108. **Hands-on expanded implementation support.** The World Bank has provided HEIS to the project to facilitate the Procurement Division (PD) that will be established in the RCU to conduct centralized procurement activities on behalf of the four participating countries through preparation of BDs, issuance of BDs, opening and evaluation of bids, and recommendation of award for the Design, Supply, and Installation of Solar Plants. They will also extend support to the PIUs in participating countries in the preparation of Request for Proposals (RFPs) and Evaluation of Proposals for the selection of Supervision Engineers.

109. **Considerations of risk of forced labor in the supply chain for solar systems**. The project will involve the procurement and installation of solar panels for connection to centralized grids. There are allegations of forced labor risks associated with the polysilicon suppliers. Prior to beginning the procurement process, the Recipients/Borrowers will undertake a market analysis to identify the possible sellers of solar panels to the project. The BDs will emphasize forced labor risks in solar panels and components and require that

sellers of solar panels to the project will not engage or employ any forced labor among their work force. The Recipients/Borrowers will require Bidders to provide two declarations: a Forced Labor Performance Declaration (which covers past performance) and a Forced Labor Declaration (which covers future commitments to prevent, monitor and report on any forced labor, cascading the requirements to their own sub-contractors and suppliers). In addition, the Recipients/Borrowers will include enhanced language on forced labor in the procurement contracts. The World Bank will prior review procurements of solar panels and components to ensure that enhanced provisions are used by the Recipients/Borrowers.

110. **Systematic Tracking of Exchanges in Procurement (STEP).** The project will use the World Bank's STEP, an online planning and tracking system that will provide data on procurement activities, establish benchmarks, monitor delays and measure procurement performance. Use of STEP is mandatory for all procurement transactions subject to post and prior review under the project.

111. **Staffing.** The implementing agencies in all project countries have both international procurement consultant and national procurement officers who are managing existing World Bank-financed energy projects and will be handling procurements for this project at national level. For regional level procurements the activities will be done by the central RCU that will be established in Liberia.

112. **Procurement risk.** The overall procurement risk associated with the project in all beneficiary countries is Substantial; procurement capacity of each country will be strengthened during implementation.

113. **Advance Contracting and Retroactive Financing.** The project design has provided a window for the Borrowers to carry out advance contracting and retroactive financing in accordance with Section V (Paragraphs 5.1 and 5.2) of the World Bank Procurement Regulations for IPF Borrowers of November 2020. The retroactive financing will be allowed up to 40 percent of the credit covering the expenditures incurred by the project with effect from the date mentioned in the FA. Retroactive financing was agreed with the Republic of Liberia and Togolese Republic and is reflected in the respective FAs[37].

114. **Sub-Component 4A**: All procurement activities will be carried out in accordance with approved updated Procurement Plans. At this stage the RITA activities are all ongoing activities under WAPP-CLSG Project (P113266); therefore, extension and amendment to existing contracts as well as new contracts are expected.

C. Legal Operational Policies

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

[37] Liberia: For payments made prior to the Signature Date, except that withdrawals up to an aggregate amount not to exceed US$600,000 and US$400,000 may be made for payments made prior to this date but on or after November 25, 2022, for Eligible Expenditures under Category 3 and 4, respectively; Togo: For payments made prior to the Signature Date, except that withdrawals up to an aggregate amount not to exceed EUR 1,000,000 and EUR 1,000,000 may be made for payments made prior to this date but on or after May 1, 2022, for Eligible Expenditures under Category 1 and 4, respectively.

115. The Policy on Projects on International Waterways (OP 7.50) applies because project activities involve the use of the Saint Paul River which is shared between Liberia and Guinea. The project falls under an exception to the riparian notification requirement under paragraph 7(a) of the Policy, because activities are limited to the extension of an existing HPP, namely MCHPP. These activities will not cause any change in water abstraction or water quality, accordingly the exception to the notification requirement was approved by the World Bank Regional Vice President on October 25, 2022.

D. Environmental and Social

116. **The project will be implemented in accordance with the World Bank's ESF and the applicable Environmental and Social Standards (ESS)**. Eight of the ten ESSs were considered relevant for the project: ESS1 (Assessment and Management of Environmental and Social Risks and Impacts), ESS2 (Labor and Working Conditions), ESS3 (Resource Efficiency and Pollution Prevention and Management), ESS4 (Community Health and Safety), ESS5 (Land Acquisition, Restrictions on Land Use and Involuntary Resettlement), ESS6 (Biodiversity Conservation and Sustainable Management of Living Natural Resources), ESS8 (Cultural Heritage), and ESS10 (Stakeholder Engagement and Information Disclosure). In addition, the ESF requirements have assessed the risks of Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) and found it to be Substantial. During implementation, as part of the social assessment, ESIA/ESMPs will include the appropriate mitigation measures relative to risk, which is aligned with the requirements outlined in the SEA/SH Good Practice Note, and will be reflected as well in contractual obligations, the Project Implementation Manual (PIM), and other key documents related to the project. Likewise, security risks will be assessed as per the standard Community, Health and Safety (ESS4) in ESIAs/ESMPs and in Togo, given security risk in the proposed project area, a Security Management Plan will be developed as part of the ESIA/ESMP. The overall environmental and social risk rating is classified as **High**.

117. **Environmental.** The environmental risk and impacts have been assessed and rated **High**. The rating considered the nature of the projects in the participating countries, the potential direct and indirect environmental risks and impacts with cumulative impact, legacy issues this and the Recipients/Borrowers' capacity on ESF implementation to manage the environmental risks and impacts. Project activities such as construction of 20 MWp Solar PV power plant on Mount Coffee Island in Liberia will rely on use of the existing facilities and infrastructure which raise legacy issues. Legacy issues include weak biodiversity management, a lack of emergency preparedness plan, and community health and safety issues. Project activities such as HPP expansion and grid activities have large footprints that might impact large areas.

118. **Potential adverse environmental risks or impacts** associated with the proposed activities during both the construction and operational phases could include (i) increased levels of dust, noise, vibration, and nuisance from earthworks, moving of construction vehicles and machinery; (ii) soil erosion and sediment control from materials sourcing areas and site preparation activities; (iii) contamination of surface and ground water sources; (iv) generation, disposal and management of surplus excavated material and other construction waste generated from construction and operation activities soil excavation and operation of machinery; (v) generation of both hazardous and non-hazardous waste; (vi) impacts on terrestrial and aquatic biodiversity associated with land clearing for installation of solar PVs, and grid infrastructure, and aquatic biodiversity, especially species of high endemic value, associated with HPP expansion component in Liberia; (vii) construction activities might impact water quality and quantity, water quality and downstream effects such as increased turbidity, water pollution due to accidental sanitary sewage, waste

disposal and concrete leaks; (viii) risk associated with the handling and disposal of hazardous waste both during construction and also operation (such as damaged/end of life solar PV, batteries, transformer oil and chemicals produced during grid O&M, etc.) and the lack of recycling facilities for used solar panels; (ix) occupational and community health and safety risks due to the exposure to physical hazards on project sites, health and safety issues, communicable diseases, including influx of workers into the area; (x) road congestion and traffic accidents due to the transportation of large volumes of materials; and (xi) electrocution of humans and wildlife by the high voltage lines carrying electricity from the plant to the distribution stations.

119. **In Liberia, a visual inspection and assessment of the safety condition of the dam of MCHPP** and associated structures has been conducted by the project team to assess their operational status and performance history, to identify any required works or safety-related measures necessary to upgrade the dams to an acceptable standard of safety. According to the dam safety assessment, there is no evidence of any deficiency that could affect the normal operation condition of the dam. However, several dam safety issues have been identified and a comprehensive dam safety program is required for Mt. Coffee extension project to be fully compliant with World Bank's requirements on dam safety (ESS4-Annex 1). The following shall be prepared by the Borrower regarding dam safety plans: (i) An updated surveillance and monitoring plan, including repair of damaged instruments and installation of new instruments, to improve the current monitoring system to correctly monitor the dam's behavior and its performance; (ii) An updated and operational O&M plan for the civil works with a specific section dedicated to O&M activities for the hydromechanical equipment of the spillway which is a critical component for the safety of the dam, but also capacity building of the staff in charge of regular surveillance activities and maintenance works (iii) Preparation and implementation of an Emergency Preparedness Plan (EPP) for normal operation of the dam, including the analysis of uncontrolled release of water and dam break with preparation of related inundation maps. Some extraordinary maintenance works are required to ensure the long-term functionality and reliability of the spillway gates, and their hoisting and control command equipment. Though it is it is not part of the current project but for the future it will be essential to assist the Government to develop a mechanism to mobilize required financing for ensuring long term safety of the dam, including regular inspection and preventive maintenance, and periodic detailed dam safety inspections and reviews by an independent dam safety specialist.

120. **Social.** The social risk classification is **High** based on the complexity and the nature of the anticipated risks and impacts of the activities, the expected location of project sites (including in insecure areas), existing legacy issues in Liberia and potentially in Sierra Leone and Togo, the level of client capacity to implement the project under the ESF, and past performance to effectively manage and monitor social risks. While these risks are expected to be manageable with proper implementation and supervision of mitigation measures, at this time, ESIAs/ESMPs and the E&S audit in Liberia and the E&S due diligence in Sierra Leone at Newton, and E&S studies have yet to be prepared for Togo, Chad, and the Lungi site for Sierra Leone. Therefore, uncertainties about project risks remain. The presence of any outstanding resettlement issues in Liberia from the 2014-2017 MCHPP rehabilitation will need to be assessed through an E&S audit and addressed. Further details on this are provided in the Liberia specific section below.

121. **Key social risks** include: physical and/or economic displacement and large land requirements needed for solar PV farms and distribution and transmission lines; legacy issues related to incomplete Resettlement Action Plan (RAP) and Livelihood Restoration Plan (LRP) in Liberia of a previous RAP in 2017 for the existing

hydropower dam; possible legacy risks in Sierra Leone at the Newton site; cultural heritage risks (possible disturbance of tombs in Liberia); land tensions in Togo and Sierra Leone; SEA/SH and social cohesion risks due to labor influx and influx of possible job seekers in project areas raising the risks for child labor and informal labor use (especially in Liberia, Togo, and Sierra Leone), including in areas that may be difficult to monitor due to security risks (such as in northern Togo); labor camp management risks (especially in Liberia); exposure to communicable diseases, such as COVID-19 and Sexually Transmitted Infection/ Sexually Transmitted Diseases resulting from the presence of project workers; and forced labor risks associated with the procurement of solar PV materials. Given the expanded scope of the ESF, and the limited experience of implementing projects under the ESF and, in some cases, PIUs managing more than one project at a time, client institutional capacity to implement the project under the ESF will require significant capacity building and institutional strengthening.

122. **Additional social risks** include: variations in institutional capacity and readiness at both national and regional coordination levels (including in the preparation and implementation of ESF instruments during implementation); the possible exclusion of vulnerable groups from receiving project benefits, such as resettlement benefits, access to jobs in the project, and access to decision making, (for groups including women, rural communities, migrants and refugees, pastoralists/ethnic minorities, the poor, illiterate persons, persons with disabilities, the elderly and others), as well as weak stakeholder engagement and grievance management.

123. **Sexual Exploitation and Abuse/Sexual Harassment.** The overall GBV risk level is Substantial. The risk of SEA/SH has been preliminarily assessed for each country using World Bank online SEA/SH risk screening tool for projects with civil works and will be reassessed before project effectiveness. Currently, the risk levels are estimated as Substantial for Liberia and Togo and moderate for Sierra Leone and Chad. Measures to address SEA/SH will be integrated within the ESIAs/ESMPs for each country and will include requirements to sign, by all project staff and workers, a Code of Conduct (CoC) clearly indicating SEA/SH as prohibited behavior and sanctions in case of misconduct; training for the staff and workers about the content of the CoC; GMs sensitive to SEA/SH complaints and with referral to local GBV service providers; awareness raising for community members (including for women in separate groups animated by a woman) on the content of CoC, ways to submit complaint and available services. In addition, all countries will develop a SEA/SH prevention and response Action Plan as part of the ESIAs/ESMPs and tailor the project level GM to handle sensitive incidents safely, ethically and confidentially such as SEA/SH. The Borrowers will also be required to prepare and implement community health and safety mitigation measures, including SEA/SH measures, at sub-project levels and for all contractors and suppliers. The mitigation measures, including the enforcement of the CoC, will be clearly stipulated in the contractor's ESMP based on the project's ESMP, for which the contractor will be fully responsible for implementation.

124. **Forced labor.** Regarding the risk of forced labor, under Environmental and Social Standard 2 (ESS2), where there is a significant risk of forced labor related to primary supply workers, the Recipients/Borrowers require the primary supplier to identify those risks and if forced labor cases are identified, the Recipients/Borrowers will require the primary supplier to take appropriate steps to remedy them. Ultimately, where remedy is not possible, the Recipients/Borrowers will, within a reasonable period, shift the project's primary suppliers to suppliers that can demonstrate that they are meeting the relevant requirements of ESS2. Prior to beginning the procurement process, the Recipients/Borrowers will undertake market analysis to identify the possible sellers of solar panels to the project. The BDs will

emphasize forced labor risks in solar panels and components and will require that sellers of solar panels to the project will not engage or employ any forced labor among their work force. Bidders will be required to provide two declarations: a Forced Labor Performance Declaration (which covers past performance), and a Forced Labor Declaration (which covers future commitments to prevent, monitor and report on any forced labor, cascading the requirements to their own sub-contractors and suppliers). In addition, enhanced language on forced labor will be included in the procurement contracts. The World Bank will prior review procurements of solar panels and components to ensure that enhanced provisions are used by the Recipients/Borrowers.

125. **ESF Capacity Building**. Technical support will be provided by the World Bank's E&S specialists to assist increased understanding of the ESF and good practices in environmental and social risk management. At minimum, the E&S staff in each PIU/RCU as well as other core staff should take the World Bank's ESF online course for Borrowers. Capacity support to be provided by the Recipients/Borrowers in collaboration with the World Bank on a range of topics under the ESF/environmental and social risk management are included in each Environmental and Social Commitment Plan (ESCP).

126. **Environmental and Social Commitment Plans (ESCPs).** The ESCPs for each Recipient/Borrower identify the material measures and actions that are required as well as their timeframe and dates of completion and define the responsibilities of the implementing entities. Prior to appraisal, the participating countries prepared and publicly disclosed in-country[38]and on the World Bank website[39] a draft Stakeholder Engagement Plan (SEP) which will be updated within 60 days of Project effectiveness and negotiated ESCPs setting out the necessary actions to ensure that the project complies with the ESSs. In each SEP, a draft Grievance Mechanism (GM) is included which shall be finalized, implemented and operational within a specific number of days of Project Effectiveness as specified in the ESCP, including the GM channel to handle incidents related to SEA/SH. The ESCPs have been prepared by the participating countries and include a timetable for the preparation and disclosure of subsequent E&S instruments and activities during implementation such as, but not limited to, ESIAs/ESMPs, RAPs, Labor Management Procedures (LMPs), Environmental and Social audit in Liberia for the Liberia MCHPP rehabilitation project (2014-2017) and the preparation of a corresponding corrective action plan and other instruments, completing implementation of a corrective action plan in Liberia, preparing Emergency Preparedness Plan for the Liberia MCHPP, Biodiversity Management Plans (BMPs), development of security management plans (in Togo). An appraisal E&S Review Summary (ESRS) was prepared in line with the World Bank's ESF requirements and was disclosed[40].

127. Each Recipient/Borrower has the overall responsibility for assessing, managing, and monitoring environmental and social risks and impacts throughout the project life cycle to meet the requirements of ESSs in a manner and within a timeframe acceptable to the World Bank.

128. **Liberia.** In Liberia, RESPITE will support construction of 20 MWp Solar PV power plant on Mount Coffee

[38] (i) *Sierra Leone* disclosed on November 29, 2022; (ii) *Chad ESCP* disclosed on November 29, 2022 and *Chad SEP* on November, 2022; (iii) *Togo English*, *Togo French* disclosed on November 29, 2022; (iv) *Liberia* disclosed on November 30, 2022; (v) *WAPP ESCP* disclosed on November 30, 2022 and *WAPP SEP* on November 18, 2022.

[39] ESCPs disclosed on the *World Bank website* on November 29, 2022. SEPs disclosed on the *World Bank website* on November 18, 2022.

[40] ESRS disclosed on *the World Bank website* on November 18, 2022.

Island (MCHPP) in Liberia, and any associated works for power evacuation under component 1A, and expansion of MCHPP under component 2. Both activities will rely on use of existing facilities and infrastructure. The PIU in Liberia has prepared two draft ESIAs, one for the construction of the Solar PV Project and one for the MCHPP Extension Project. An E&S gap assessment has been prepared to identify legacy issues related with existing facilities and infrastructure that will be utilized by the project activities. The ESIAs are under review by the World Bank and will be finalized for disclosure once the findings of an E&S audit have been incorporated into the E&S instruments. The gap assessment highlighted infrastructure and activities related to the operation of the MCHPP and the incomplete implementation of the RAP and LRP developed under previous rehabilitation works for the MCHPP (in 2017). Measures to be undertaken by the Borrower during implementation include the preparation of site specific ESMPs that will be implemented during operation to decommissioning phases to address legacy issues in the E&S audit, update the dam safety plans, develop an EPP for the dam, and install surveillance and monitoring equipment and a monitoring program. The E&S Audit will be prepared based on ToRs cleared by the World Bank. The Borrower will also renew environmental permit and licenses, develop and implement a Plan for contractors for E&S compliance review, M&E procedures, and address legacy issues. The Borrower will undertake an E&S assessment to address potential E&S risks and mitigation measures associated with potential inundation in the downstream of the HPP. The E&S audit and corrective actions/mitigation measures shall be prepared and disclosed prior to the start of project activities and implemented throughout Project implementation.

129. **Sierra Leone:** In Sierra Leone, no ESF instrument has been developed for project activities, however a detailed feasibility study was concluded in late October 2022. A detailed ESIA/ESMP shall be prepared based on the nature and scale of the activity and its potential environmental and social risks and impacts during implementation before the initiation of any civil works. While a new ESIA study will be initiated for the Lungi site, there is an existing ESIA for the Construction of the 6 MWp Grid Connected Solar Power Plant for the Newton site. This was prepared three years ago by the Ministry of Energy and financed by another donor and will be adjusted during implementation to ensure consistency with the ESF and undertake additional consultations and reassess the environmental and social context. Additional ESF requirements to be undertaken during implementation are included in the ESCP.

130. **Chad and Togo** have begun the necessary technical and E&S studies and will complete them during implementation and prior to the start of project activities. ESIAs/ESMPs will be prepared and disclosed prior to the launch of the bidding process for such activities. Other ESF requirements including the preparation of a Security Management Plan to be included in the ESIA/ESMP in Togo, RAPs, LMPs for both countries, and well as other measures are included in the ESCPs.

131. **Cumulative impacts** from existing facilities adjacent to the project infrastructure (at Newton in Sierra Leone for example), and distribution lines supplied from the installation will be studied as part of the overall project ESIA process. The project will utilize the WBG's Environment, Health, and Safety Guidelines (EHSGs) for energy and electricity sector specific and general EHSGs.

132. **Sub-component 4A (implemented by WAPP).** The required ESCP and SEP instruments corresponding to sub-component 4A (the TA activities implemented by WAPP) have been prepared in line with the World Bank's ESF requirements and were disclosed by the Recipient and World Bank. A simplified ESMP for activities under Component 4.A will be prepared by the Recipient no later than three months after the

Effective Date. The project under Sub-component 4D will support preparation of new hydro projects in the country including conducting studies for the design. These studies shall consider environmental and social issues including preparing ESIA depending on the scope and purpose of the studies.

133. **Other relevant site-specific management plans** to be included in each ESIA/ESMPs include the Contractor's ESMP, Occupational Health and Safety Plan /Community Health and Safety Plan, and Waste Management Plan (to address waste management during construction and operation, with specific reference to handling and disposal of old/damaged battery and electronic waste). Based on the screening of sub-projects for biodiversity risks and impacts, a BMP will form part of the ESIA/ESMP in accordance with the guidelines of the ESIA that shall be prepared for the Project, and consistent with ESS6. In addition, Traffic Management Plan, SEA/SH Prevention and Response Action Plans, and site-specific Security Management Plans (i.e., Togo), will be developed by the contractors prior to commencement of civil works. Furthermore, each Borrower include in BDs for contractors that they comply with the ESIAs/ESMPs, including preparing construction management plans.

134. **PIU/RCU E&S Staffing.** The implementation agencies for the project's various activities in their respective countries and in the RCU will be required to hire or appoint qualified environmental and social specialists to support in the management of E&S risks and impacts associated with the implementation of the sub-projects. The staffing requirements are included in the ESCPs. The specialists will manage risks during implementation, including E&S screening; ensuring the development of the requisite E&S assessments and relevant documents by external consultants/firms; overseeing stakeholder consultation; managing contractor performance; and conducting implementation monitoring and reporting

135. **Grievance Mechanism**: A project-specific GM for every Recipient/Borrower is described in the SEP to manage complaints, feedback, and concerns of stakeholders and beneficiaries in a transparent, accessible, and timely manner. The PIU's and RCU shall establish the preliminary GM and update it to adequately cover all grievance procedures according to the specific timelines mentioned in the respective ESCP, and thereafter maintain and operate the mechanism throughout project implementation. The GM will also include a confidential, survivor-centered, efficient, and ethical channel to address SEA/SH complaints which also considers access to quality legal, health, and psychosocial support services for survivors, which will be developed as part of the SEA/SH Prevention and Response Action Plan and mapping of such services. The Action Plan will be prepared for all countries. This process will be carried out using dedicated communication materials, which will be developed to help stakeholders become familiar with the grievance redress channels and procedures. The GM will be accessible and understandable for all stakeholders in the project and for the entire project life. The GM will be communicated to all relevant stakeholders and will also be applicable for any contractor that will provide service for the project during the construction and operations phases. A physical and electronic database or register will be maintained by the PIU for all non-sensitive complaints and will be submitted for periodic review by the World Bank, as required.

E. Corporate Requirements

Gender

136. In Togo, female-headed households have disproportionately lower access to electricity at 80.5 percent as compared to male-headed households at 84.4 percent in urban, and at 16.1 vs 16.9 percent in rural areas.

Even though a gender gap persists across all wealth quintiles and various household situations, female-headed households with access to electricity tend to have a higher wealth index as well as higher educational attainment than those without access, which can be partly explained by the fact that households with these characteristics are more frequent in urban settings where electricity connections are relatively easier to obtain. This means that vulnerable rural households that could benefit more for example through improvements in time spent on chores or increased study times are even more disadvantaged in spite of a seemingly narrower gap, due to their lower access to information and finance. The project will therefore be leveraged to close identified gender gaps (which are the lack of information about electrification measures and the difficulties to afford connections) in Togo. This will be done by reducing disparity of access of poorer urban households and, in particular, of those within this category that are female headed. The pro-poor mechanisms will possibly include loans or payment in instalments (with specific measures to be confirmed after additional assessment), as well as targeted communication campaigns that will help alleviate their lower access to information. This will include a targeted outreach to these households to inform them about the electrification measures, connection fees, administrative requirements and any additional challenges that they might face.

137. In addition, taking into account the significant disadvantage of women in the energy sector globally and in the region in particular (with women accounting to only 22 percent of the labor force in the oil and gas sector and 32 percent in renewables) the project will seek complementarities with ongoing efforts on women's employment in ongoing or planned projects such as the LESSAP (P173416) as well as the Togo IDEA (P176769) with specific actions to be defined during implementation. Relevant indicators will track progress towards reduced disparity of household electricity access to achieve that 27 percent of household electricity connections are for female-headed households (which reflects their average prevalence in the country). It is expected that 100% of the female-headed households will be connected, as the prevalence of female-headed households nationwide is 27%. Other output and gender-related indicators will be included in the PIM.

Citizen engagement

138. Given the emergency nature of the project, i.e., the response to alleviate the risk of civil strife given the rising oil prices and countries' dependence on thermal-based generation, the project will prioritize setting up GMs to address any potential citizen concerns in all four participating countries. The project will establish the following citizen engagement mechanisms: (i) stakeholder consultations, which will be conducted throughout implementation and feedback will be integrated into the project's interventions and considered in any course correction measures, and (ii) adoption of GM at the country level and in WAPP to enable beneficiary feedback loop. The GMs are subject to further revision during implementation pending consultations with affected communities since this project is prepared under emergency procedures. In line with the requirements of ESS10, the GMs are inclusive and accessible. Additionally, the project could also engage citizens through community monitoring during the construction phase, and the community feedback during implementation is included in the SEPs.

Climate Change

139. The region is greatly affected by the consequences of climate change. Relevant risks for this project include wildfire (high risk), landslide activity (high risk), flooding (high risk), and droughts (medium risk)[41]. As mentioned in the Climate Change Annex 5, the resilience of the RESPITE project will be increased by

[41] https://thinkhazard.org/en/

appropriate siting and design of project generation facilities. The resilience through the project will be affected by multiple project outcomes. The project will also help in reducing GHG emissions and help achieve respective countries' NDCs and promote economic productivity. The project will help increase electricity access across all four countries, which is essential for economic growth. This will be done by installing 106 MW of grid connected solar and 41 MW of hydro that will help increase supply of clean electricity to the grid and make power supply more reliable, while reducing the fiscal impact of the sector in project countries. The project will help Sierra Leone achieve its aspirations of becoming a middle-income country by 2039 and also achieve the targets mentioned in its recently updated INDC such as reduction in CO2 emission levels by 25 percent by 2050. RESPITE will support Liberia's economic productivity by reducing energy cost and increasing installed generation while reducing GHG emissions by 64 percent by 2030. In Chad, RESPITE will add 35 MWp of solar and help set a benchmark for the government to acquire solar generation through competitive procurement. This will help the country achieve the goals of its 2017-2021 NDP which noted the importance of electricity in economic development. RESPITE plans to install 25MWp of solar in Togo as well as the needed T&D infrastructure for this power to be supplied to the end users. This will help Togo meet its 2018-2022 NDP goals, which identified the importance of reliable electricity in agriculture, manufacturing, and extractives.

V. GRIEVANCE REDRESS SERVICES

140. **Grievance Redress**. Communities and individuals who believe that they are adversely affected by a project supported by the World Bank may submit complaints to existing project-level grievance mechanisms or the World Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the World Bank's independent Accountability Mechanism (AM). The AM houses the Inspection Panel, which determines whether harm occurred, or could occur, as a result of World Bank non-compliance with its policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address complaints through dispute resolution. Complaints may be submitted to the AM at any time after concerns have been brought directly to the attention of World Bank Management and after Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's GRS, please visit http://www.worldbank.org/GRS. For information on how to submit complaints to the World Bank's AM, please visit https://accountability.worldbank.org.

VI. KEY RISKS

141. The overall risk rating of the proposed project is **Substantial**. The project's main risks and related mitigation measures are described below.

142. **Political and Governance: High**. The four participating countries have never worked together before though Liberia and Sierra Leone are part of the CLSG regional interconnector. All four countries are faced with varying degrees of fiscal pressures due to the rising oil prices and have different political priorities when it comes to tackling these challenges. Domestic political situations are also very different in each country leading to fundamentally separate dynamics pertaining to energy transition and the speed at which it needs to be implemented. Sierra Leone already experienced civil unrest due to rising prices and is moving

towards elections next year along with Liberia. All of these factors may impact the progress of the project, especially given the enormous political buy-in required for the quick implementation of the project. In order to mitigate some of these issues, the World Bank has worked closely to build support for the project and get strong political buy-in. At the same time the project has been designed in such a way that delays in one country would not impact the other. The project is proposing that the RTC is set up immediately for representatives of the countries to align on the various issues. In addition, to support the quick implementation of the project, the four participating countries have signed an MoU, agreeing on the implementation arrangements and moving forward with procurement related activities.

143. **Macroeconomic: Substantial**. The genesis of the project stems from the impact of the war in Ukraine and the resulting food price inflation seen across the globe. The impact of the situation on oil prices has left a big fiscal hole in the budgets of the participating countries as they have substantial liquid fuel-based generation share in their systems. The power sectors of all four participating countries which were already reeling under the macroeconomic impact of COVID-19 are now facing rising oil and food prices, interest rate hikes across the Western world, and currency fluctuations that are adding to their woes. Future investments in the sector are deeply impacted given the precarious fiscal situation of these countries. While there are significant macroeconomic risks within each country, since the project does not involve counterpart funding, the implementation of the activities under the project are not expected to be significantly impacted by these risks. Almost all of the macroeconomic risks stem from external factors; the countries need to carry out reforms aimed at creating fiscal space. DPF series aimed at reforms to improve inclusiveness and sustainability of development finance are currently being implemented in Sierra Leone and Liberia while similar projects aimed at transformational change in Chad and Togo are in the pipeline. The project itself addresses the fiscal issues at heart of the crisis in these countries by reducing their dependence on oil-based electricity generation and increasing supply of clean and affordable power in the countries.

144. **Sector strategies and policies: Substantial.** One of the key foundations of the project is the desire of all participant countries to move away from liquid fuel generation. This desire to begin their energy transition journey has made the project and its associated interventions a priority for the participating countries. However, any change in this policy goal for the countries could be a serious challenge to the project. As two (Liberia and Sierra Leone) of the countries are going for elections next year, a policy or strategy shift cannot be ruled out. A benefit of RESPITE is that the generation sub-projects are part of the countries' least-cost power development plans. At the same time, long-term interventions in each of the countries are underway to bring about lasting change in the sector and make it more financial and institutionally sustainable. In Sierra Leone, the government is determined to engage private sector to manage distribution; sector governance, ownership, and operation of major power infrastructure could change and impact the project. In Togo the security situation in the Northern region has prompted the government to focus on building infrastructure in the area but any changes in the underlying conditions in the region or political commitment could impact the project significantly. In Chad, the World Bank has just begun re-engaging in the sector with a focus to increase access, rehabilitate ageing infrastructure and turnaround the utility. While all priorities are in line with the project right now, any change in these could lead to significant challenges for the sector. Similarly in Liberia, the World Bank is involved in improving the financial and operational performance of the utility while increasing access. With elections due next year, a change in priorities of the government could impact the project as well. World Bank remain engaged with their clients to ensure that the existing long-term goals and strategy in the sector remain a government

priority. The World Bank is supporting the governments of each of the countries to move forward with the reform process in the sector to ensure that there is long term sustainability in the sector.

145. **Institutional capacity of implementation and sustainability: High.** Three of the four participating countries have no experience procuring, installing, or operating a grid scale solar power plant (Togo being the exception). The technical capacity of the implementing agencies is generally considered to be weak but given the lack of experience with solar power, this is especially the case for this project. The risk is therefore high. However, a number of mitigation measures have helped to bring the residual risk to substantial. The use of PIUs with prior experience with World Bank-funded projects will help overcome these challenges and support the implementation of the project, as well as enhance the compliance with the World Bank processes and policies. The World Bank has worked closely with the Recipients/Borrowers to build political buy-in to ensure that there is strong commitment not only at the political level but also at the implementing agency. The project design includes a few measures to ensure that project implementation is not delayed or hampered. The planned centralized procurement with World Bank HEIS support will not only attract international players but will bring technical expertise for the procurement of solar, storage, and hydro turbines for all four countries. The World Bank HEIS team will also provide any PIU needed support in selection of supervision engineer. To increase the technical capacity of the PIUs, they will receive training from the RCU on solar related procurement as well as workshops on solar PV plant construction and operations. Given the mitigation efforts, the residual institutional capacity and sustainability risks are classified as **High**.

146. **Fiduciary**: **Substantial.** Although the project will be implemented through existing PIUs in three out of four countries and hiring of a PoE to manage centralized procurement at the RCU, the number of countries and stakeholders involved might pose a substantial risk during implementation. To ensure that the PIUs have the right capacity to implement the project, action plans have been drawn for increasing PIU capacity. The project will require the hiring of adequate staff for implementation and includes TA activities that will support capacity building at the PIUs.

147. **Environmental and Social: High**. The rating considers the nature of the project, the potential direct and indirect environmental risks and impacts with cumulative impacts, legacy issues, and the Recipients/Borrowers' capacity on ESF implementation to manage the environmental risks and impacts. Potential adverse environmental impacts are site specific and reversible, and mitigation options are available. However, outstanding issues related to the Mt. Coffee HPP dam safety, monitoring, and EPP, impact on terrestrial and aquatic biodiversity associated with land clearing for solar PV and HPP expansion in Liberia, increased environmental risk to High. The social risk classification is High based on the complexity and the nature of the anticipated risks and impacts of the activities, the expected location of project sites (including in insecure areas), existing legacy issues in Liberia and potentially in Sierra Leone and Togo, the level of client capacity to implement the project under the ESF, and past performance to effectively manage and monitor social risks. While these risks are expected to be manageable with proper implementation and supervision of mitigation measures, at this time, E&S studies and audits have yet to be prepared and significant uncertainties about project risks remain. The overall SEA/SH risk for the project is Substantial.

148. **Stakeholder: Substantial**. The stakeholder risk for the project stems from the fact that sector stakeholders in each country have varying interests and may have different, possibly contrasting goals vis-vis the project. Public or private entities with interest in liquid fuel-based generation in the countries may be opposed to

the development of solar assets in the country that threaten to reduce the former's share in generation. Mechanisms for stakeholder engagements are described in the SEPs developed for each country. The World Bank will also continue to provide guidance and advice to the four governments throughout the process to manage stakeholders and build support for the project.

VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Western and Central Africa

Regional Emergency Solar Power Intervention Project

Project Development Objectives(s)

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

Project Development Objective Indicators

Indicator Name	PBC	Baseline	Intermediate Targets				End Target
			1	2	3	4	
Rapidly increase grid-connected renewable energy capacity							
Generation capacity of energy constructed or rehabilitated (CRI, Megawatt)		0.00	46.00	56.00	106.00	147.00	147.00
Hydropower generation capacity rehabilitated under the project (CRI, Megawatt)		0.00	0.00	0.00	0.00	41.00	41.00
Renewable energy generation capacity (other than hydropower) constructed under the project (CRI, Megawatt)		0.00	46.00	56.00	106.00	106.00	106.00
Net greenhouse gas (GHG) emissions (CRI, Metric tons/year)		0.00	0.00	0.00	0.00	0.00	265,300.00

Indicator Name	PBC	Baseline	Intermediate Targets				End Target
			1	2	3	4	
Installed capacity of battery storage (Megawatt hour(MWh))		0.00	10.00	28.00	88.00	90.70	90.70
Generation capacity for power trade in ECOWAS (Megawatt)		0.00	0.00	0.00	92.00	92.00	92.00
Supply of renewable energy (Gigawatt-hour (GWh))		0.00	0.00	0.00	213.00	573.00	573.00
Strenghten regional interconnection							
WAPP Priority projects brought to the point where investment-grade feasibility studies and associated documentation have been completed (Number)		7.40	0.00	9.00	9.00	9.00	9.00
Ratio of annual total hours of synchronization of WAPP areas 1, 2 and 3 against total hours in a year (Percentage)		0.00	0.00	25.00	25.00	25.00	25.00

Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	Intermediate Targets				End Target
			1	2	3	4	
Component 1: Construction of Solar PV with BESS and Grid Connection							
O&M contracts under implementation (Yes/No)		No	Yes	Yes	Yes	Yes	Yes

Indicator Name	PBC	Baseline	Intermediate Targets				End Target
			1	2	3	4	
11kV Transmission lines constructed under the project (Lungi transmission line) (Kilometers) (Kilometers)		0.00	20.00	45.00	75.00	115.00	115.00
Component 2: Expansion of Mt. Coffee Hydro Power Plant and Dam Safety Enhancement							
Comprehensive dam safety program for Mt. Coffee prepared (Yes/No)		No	No	Yes	Yes	Yes	Yes
Component 3: Distribution Expansion and Transmission Optimization							
Transmission and Distribution line constructed or rehabilitated under the project (LT lines) (Kilometers)		0.00	0.00	0.00	50.00	191.00	191.00
Transmission and Distribution line constructed or rehabilitated under the project (MT lines) (Kilometers)		0.00	0.00	0.00	43.00	143.00	143.00
Public-lighting posts installed (Number)		0.00	0.00	0.00	0.00	0.00	1,853.00
Electrified localities under the project (Number)		0.00	0.00	0.00	10.00	64.00	64.00
Reactive power compensation(MVARs) support PV -MVARs (Bumbuna 161 kV line) (Text)		0 MVARs	15 MVARs	30 MVARs	50 MVARs	70 MVARs	100 MVARs
Transformer capacity installed (Kilovolt-Amphere(KVA))		0.00	30,000.00	60,000.00	60,000.00	66,400.00	66,400.00
People provided with new or improved electricity service (CRI, Number)		0.00	0.00	0.00	0.00	0.00	57,520.00

Indicator Name	PBC	Baseline	Intermediate Targets				End Target
			1	2	3	4	
People provided with access to electricity under the project by household connections (grid or off-grid). (CRI, Number)		0.00	0.00	0.00	0.00	0.00	11,520.00
Female-headed households provide with access to electricity (Percentage)		0.00	0.00	0.00	0.00	0.00	27.40
Component 4: Regional Coordination, Institutional Strengthening, and Implementation Support							
Grievances registered and addressed within the project's GRM timeframe (Percentage)		0.00	50.00	60.00	80.00	90.00	100.00
Staff of the implementing agencies trained in procurement, operation and maintenance of the solar plants (Yes/No)		No	No	Yes	Yes	Yes	Yes
Project lessons learned, standard procurement documentation prepared and shared with WAPP (Yes/No)		No	No	Yes	Yes	Yes	Yes
Testing of the governors of power stations necessary for synchronization is completed (Number)		18.00	0.00	20.00	20.00	20.00	20.00

Monitoring & Evaluation Plan: PDO Indicators					
Indicator Name	**Definition/Description**	**Frequency**	**Datasource**	**Methodology for Data Collection**	**Responsibility for Data Collection**
Generation capacity of energy constructed or rehabilitated					
Hydropower generation capacity rehabilitated under the project		One time (2026).	LEC	Project implementation reports	RCU, Liberia PIU
Renewable energy generation capacity (other than hydropower) constructed under the project		Annual.	AT2ER, EDSA, LEC, SNE.	Project implementation reports. The national utilities will provide the data for the individual countries. Final target (cumulative value): 106 MW, of which 16 MW Liberia, 40 MW Sierra Leone, 30 MW Chad, 20 MW Togo.	RCU, national PIUs
Net greenhouse gas (GHG) emissions	Project net greenhouse gas (GHG) emissions are calculated as an annual average of the difference between project gross (absolute) emissions aggregated over the economic lifetime of the project and the emissions of a baseline (counterfactual) scenario aggregated over	One time. The indicator value is negative and it takes into account the greenhou se gas abatement of the entire project (both	AT2ER, EDSA, LEC, SNE.	Project implementation reports	RCU, national PIUs

	the same time horizon. They are reported in metric tons of carbon dioxide equivalent per year.	solar and hydro plants).			
Installed capacity of battery storage	The indicator measures the expected capacity of battery storage to be installed in Sierra Leone, Chad and Togo.	Annual.	AT2ER, EDSA, SNE.	Project implementation reports. The national utilities will provide the data for the individual countries. Final target (cumulative): 90.7 MWh, of which 28 MW Sierra Leone, 60 MWh Chad, 2.7 MWh Togo.	RCU, national PIUs
Generation capacity for power trade in ECOWAS	The indicator measures the availability of generation capacity for power trade in ECOWAS.	One time.	EDSA, LEC.	Project implementation reports	RCU, national PIUs
Supply of renewable energy	The indicator measures the increased supply of renewable energy to the grid in the four participating countries.	Annual, starting from 2025.	AT2ER, EDSA, LEC, SNE.	Project implementation reports. The national utilities will provide the data for the individual countries. The targets below represent the breakdown of the intermediate targets by country: • Intermediate target 03: 57 GWh Chad, 75	RCU, national PIUs

				GWh Sierra Leone, 59 GWh Togo, 22 GWh Liberia • Intermediate target 04 and final target: 113 GWh Chad, 149 GWh Sierra Leone, 118 GWh Togo, 193 GWh Liberia	
WAPP Priority projects brought to the point where investment-grade feasibility studies and associated documentation have been completed	The indicator measures the preparedness of WAPP priority projects. The 0.4 in 7.4 baseline value represents 40% progress made in completion of the SP feasibility study. The indicator will measure the completion of this and an additional feasibility study.	One time	WAPP Secretariat	Project implementation reports	WAPP Secretariat
Ratio of annual total hours of synchronization of WAPP areas 1, 2 and 3 against total hours in a year	Measure within CEB network as an approximation for the whole zone.	One time, in year 2024.	M&E function of WAPP Secretariat	Annual data of National Control Centers	WAPP Secretariat

Monitoring & Evaluation Plan: Intermediate Results Indicators					
Indicator Name	**Definition/Description**	**Frequency**	**Datasource**	**Methodology for Data Collection**	**Responsibility for Data Collection**
O&M contracts under implementation	The indicator measures the continuity of O&M support to the four utiltiies.	Annual	AT2ER, EDSA, LEC, SNE	Project implementation reports	RCU, national PIUs
11kV Transmission lines constructed under the project (Lungi transmission line) (Kilometers)	The indicator measures the addition of 11kV Transmission lines constructed under the project.	Annual.	EDSA.	Project implementation reports	RCU, national PIUs
Comprehensive dam safety program for Mt. Coffee prepared	The indicator measures the completion of a dam safety program for Mt. Coffee.	One time: it is expected that the dam safety program for Mt. Coffee will be prepare d by December 2024.	LEC.	Project implementation reports	RCU, Liberia national PIU
Transmission and Distribution line constructed or rehabilitated under the project (LT lines)	The indicator measures kilometers of additional transmission and distribution lines constructed or rehabilitated under the project (LT lines).	Annual, from year 2025.	AT2ER	Project implementation reports	RCU, national PIUs

Transmission and Distribution line constructed or rehabilitated under the project (MT lines)	The indicator measures kilometers of additional transmission and distribution line constructed or rehabilitated under the project (MT lines).	Annual, from year 2025.	AT2ER	Project implementation reports	RCU, national PIUs
Public-lighting posts installed	The indicator measures the number of public lighting posts installed.	One time: it is expected that the lighting posts will be installed in the last year of the project implement ation.	AT2ER	Project implementation reports	RCU, national PIUs
Electrified localities under the project	The indicator measures the number of electrified localities under the project.	Annual, from year 2025.	AT2ER	Project implementation reports	RCU, national PIUs
Reactive power compensation(MVARs) support PV -MVARs (Bumbuna 161 kV line)	The indicator measures the reactive power compensation (MVARs) achieved for the Bumbuna 161 kV line after the installation of voltage regulation equipment under Component 3A of the project. The indicator	Annual.	EDSA	Project implementation reports	RCU, national PIUs

	measures the reactive power compensation (MVARs) achieved for the Bumbuna 161 kV line after the installation of voltage regulation equipment under Component 3A of the project.				
Transformer capacity installed	The indicator measures Kilovolt-Ampheres of transformer capacity installed.	Annual.	EDSA, AT2ER	Project implementation reports. The national utilities will provide the data for the individual countries. Final target (cumulative value): 60,000 KVA Sierra Leone and 6,400 KVA Togo	RCU, national PIUs
People provided with new or improved electricity service					
People provided with access to electricity under the project by household connections (grid or off-grid).		One time: it is expected that the connections will happen in the last year of implementation, following the	AT2ER - the indicator measures the number of households provided with access to electricity in Togo.	Project implementation reports	RCU, national PIU

		construction of the solar plant and the rehabilitation of the T&D lines.			
Female-headed households provide with access to electricity	The indicator measures the proportion of female-headed households provided with access to electricity in Togo. It is expected that 100% of the female-headed households will be connected, as the prevalence of female-headed households nationwide is 27%.	One time: it is expected that the households will be provided with access in the last year of implementation, following the construction of the solar plant and the rehabilitation of the T&D lines.	AT2ER	Project implementation reports	RCU, national PIUs

Grievances registered and addressed within the project's GRM timeframe	The indicator measures the progress in GRM implementation.	Annual	AT2ER, EDSA, LEC, SNE	Project implementation reports	RCU, national PIUs
Staff of the implementing agencies trained in procurement, operation and maintenance of the solar plants	The indicator measures the transfer to skills to the staff of the implementing agencies.	One time: the training is planned for calendar year 2024.	AT2ER, EDSA, LEC, SNE	Project implementation reports	RCU, national PIUs
Project lessons learned, standard procurement documentation prepared and shared with WAPP	The indicator measures the knowledge exchange with WAPP.	Annual	RCU, WAPP	Project implementation reports	RCU
Testing of the governors of power stations necessary for synchronization is completed	The indicator measures the progress in implementation of testing of the governors of power stations necessary for synchronization.	One time: the testing is expected to be completed in 2024.	WAPP Secretariat	Project implementation reports	WAPP Secretariat

ANNEX 1: Implementation Arrangements and Support Plan

Detailed Implementation Arrangements

1. **An 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 is a consultative body that will meet periodically (at least bi-annually) to review the status of the project and discuss progress and potential problems in the implementation of subcomponents in each country. The RTC will also provide guidance and recommendations to the RCU and to the utilities in charge of implementation.

2. **An RCU, for overall project coordination and to carry out procurement (Component 1, 2A) for the project, will be set up**. The RCU will be responsible for overall coordination of the project that includes quality assurance, M&E, 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 PoE who will be responsible for supporting the procurement of infrastructure works. The RCU will be domiciled in Liberia to ensure timely implementation of project.

3. **The role of the PoE is critical to rapid project implementation, bringing down costs and attracting international private players**. The PoE will consist of one international procurement expert who will also head the PoE, two international experts (one for solar and one for T&D) and one support staff. Each country will also nominate at least one 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.

4. **Given the emergency nature and speed of response required to address the crisis in participating countries, the procurement process will begin before project approval.** To avoid delays and begin procurement immediately the countries have agreed on the implementation framework and the procurement arrangements through a MoU signed between them. The PoE will be put in place immediately after to advance procurement-related activities. The PoE will be housed at the Liberia PIU before RESPITE is effective and the PoE contracts will be moved to the RCU after effectiveness.

5. **The existing Liberia PIU will be responsible to begin the procurement related works before project approval with support from World Bank HEIS**. To accelerate procurement the PIU for the LESSAP (P173416) will be tasked with initiating the process. For this purpose, the PIU, with World Bank's HEIS support, will recruit the individuals for the PoE. Once the RCU has been established, it will take over the contracts of the PoE's experts and support staff.

6. **The WAPP Secretariat will implement Component 4A (RITA) which includes TA activities.** This is a

continuation of the successful implementation arrangements for Component 2 of the WAPP-CLSG Interconnector Project (P113266). The team within the Secretariat implementing Component 2 has a coordinator, five technical staff, a senior procurement specialist, an assistant procurement specialist and a disbursement specialist/accountant. This team will remain in place under RESPITE. More broadly, WAPP also will play a coordination and facilitation role to help countries work together to accelerate this type of procurement even outside of RESPITE.

Table A1.1. Implementation of components by agencies

Project Component	Implementation Unit	Cost of Activities (US$ million)
Sub-Component 1A, Component 2, Sub-Component 4C, Sub-Component 4D	LEC	94.5
Sub-Component 1B, Sub-Component 3A, Sub-Component 4C	EDSA	73.7
Sub-component 1C, Sub-Component 4C	SNE	58.9
Sub-Component 1D, Sub-Component 3B, Sub-Component 4C	AT2ER	58.9
Sub-Component 4B	Liberia-based RCU	5.0
Sub-Component 4A	WAPP	20.0

Overall Implementation Support Needs

7. The World Bank team will be composed of members with different skills and required experience for successful project implementation. Tables A1.2 and A1.3 outline the expected staff/ weeks and travel required to make sure the actions and schedule are appropriately resourced.

Table A1.2. World Bank Implementation Support

Time	Countries	Focus	Skills Needed	Resource Estimate (US$, thousands)
First 6 months	Sierra Leone and Liberia	• Procurement • Implementation of ESIA and RAP • Preparation and implementation of LMP and SEA/SH Action Plan • Revision and implementation of SEP/GM • E&S risk management/monitoring/reporting • EPP (Liberia), monitoring/surveillance of dam/updating dam safety plans – instrumentation plan, O&M plan and EPP.	Solar and BESS expert, hydro expert, engineering, T&D expert, procurement, FM, environmental, social, and gender/GBV	150
	Chad and Togo	• Preparation of procurement documents • Preparation of ESF instruments (ESIA/ESMP, LMP, Security Plan, SEA/SH Activities) • Implementation of SEP/GM • E&S risk management/monitoring/reporting	Solar and BESS expert, T&D expert, procurement, FM, environmental, social, and gender/GBV	150

Time	Countries	Focus	Skills Needed	Resource Estimate (US$, thousands)
6-12 months	Sierra Leone and Liberia	• Review of progress in construction • Capacity building • M&E, ESF, SEA/SH and FM • E&S monitoring and reporting • EPP (Liberia), monitoring/surveillance of dam/updating dam safety plan	Engineering, Solar and BESS expert, hydro expert, T&D expert, FM, environmental, social, and gender/GBV, M&E	100
	Chad and Togo	• Procurement • Implementation of ESIA and RAP • Security risk management • SEA/SH • E&S monitoring and reporting	Solar and BESS expert, engineering, T&D expert, procurement, FM, environmental, social, and gender	150
12-24 months	Sierra Leone and Liberia	• Review of progress in construction • Review of O&M • Capacity building • M&E, ESF, and FM	Solar and BESS expert, engineering, T&D expert, Hydro expert, procurement, FM, environmental, social, and gender, M&E	150
	Chad and Togo	• Review of progress in construction • capacity building • M&E, ESF, and FM		150
24-60 months	Sierra Leone, Liberia, Chad and Togo	• Review of progress in construction • Review of O&M • Capacity building • M&E, ESF, and FM	Solar and BESS expert, engineering, T&D expert, Hydro expert, procurement, FM, environmental, social, and gender, M&E	500
0-24 months	WAPP	• M&E, ESF and FM • Capacity building	T&D expert, solar expert, Hydro expert, FM, Environment, Social, GBV and M&E	250

Table A1.3. Skills Mix Required

Skills Needed	Number of Staff Weeks	Number of Trips per Year	Comments
Team leaders	20	4	
Energy specialists	20	4	
Procurement specialists	5	2	
Procurement specialists	10	0	Field Staff
FMS	5	2	Field Staff
Environmental specialists	10	4	Field staff
Social specialists	10	2	Field staff/from headquarters
GBV specialists	10	1	Region
Gender specialists	4	2	Field staff
Operational support	4	0	From headquarters/region
Specialized technical experts	10	4	
Administrative support	4	As required	

Financial Management Arrangements

Liberia

8. The PFMU will be responsible for the day-to-day management of funds and accounting for the proposed project. The project shall use the PFMU's Financial Procedures Manual already developed for ongoing projects, and it will be brought into the Integrated Financial Management Information System (IFMIS) system, currently PFMU is using Sun system and the process of migrating is in process and it is expected that PFMU will fully migrate to IFMIS by November 2022. The PFMU shall be responsible for the project's financial reporting, using already agreed unaudited IFR formats in use for other projects. The PFMU is adequately staffed with competent finance professionals who have garnered the requisite experience and have qualifications acceptable to the World Bank. There is already an established PIU which will be responsible for the day-to-day operations of the project. A segregated US$ Designated Account (DA) will be opened for the project.

9. **Budgeting.** The assessment has revealed that there is a budgeting system in place at PFMU to ensure smooth implementation of the project to achieve the project development objectives. This system is unique to other World Bank-financed projects (financially managed at the PFMU). The PIU will be responsible for the implementation of the project. In collaboration with the PFMU, the PIU, before the commencement of the government's fiscal year which runs from January 1 to December 31, will be required to prepare and submit an annual work plan and budget which will be derived from the procurement plan and disbursement plan to the World Bank for no objection by end of October of each year after the obtaining approval from the RCU before the beginning of the fiscal period. The project management is expected monitor the implementation progress against the work plan and budget for the planned project expenditures under each disbursement categories/components. These arrangements would apply for the proposed project.

10. **Internal Controls and Audit:** The PFMU updated Financial Procedures Manual and the provisions of the revised amended and restated Public FM Act of the Republic of Liberia will govern the internal controls. The PFMU has established an Internal Audit Section that will undertake the risk based internal audit methodology and will submit the internal audit reports 45 days after the quarters ended March and September of each year. The Internal Auditor is a qualified accountant and will conduct an enterprise risk assessment of the project and the PFMU on an annual basis. There is adequate segregation of duties within the PFMU to host the project, the vaccine distribution will also be captured in the implementation manual. All of these controls will also be applied to the project. The project will maintain fixed assets for all material assets that will be acquired using the project funds. The Senior FM Specialist at the World Bank will provide the necessary capacity building training to the Internal Auditors to enhance their capacity in arears of capacity gaps.

11. **Accounting and maintenance of accounting records:** The project will use the SUN accounting system for project accounting and financial. The accounting system is currently in use at the PFMU. The project progress in using the system will be followed closely by the Senior FM Specialist at the World Bank. The Senior FM Specialist will identify and provide mitigating measures on any challenges that may arise with the SUN system. It is expected that the SUN Accounting software will be adequate for accounting purposes for the project.

12. **Periodic Financial Reporting:** The Director of Donor Financed Projects at the PFMU will be responsible for preparing the quarterly interim unaudited IFRs. The IFRs will be submitted to the World Bank 45 days after end of each fiscal calendar quarter. The project will also prepare annual financial statements at the end of the fiscal period in accordance with International Public Sector Accounting Standards – cash basis. The financial statements will comprise, at a minimum, of: (i) Sources and uses of funds (summary of Expenditures shown under the main program headings and by main categories of expenditures for the period); (ii) Notes to the financial statements, including background information on the project, the accounting policies, detailed analysis and relevant explanation of the main accounts/major balances, etc. In addition, the project shall provide, as an annex to the financial statements, an inventory of fixed assets acquired according to asset classes, dates of purchase, location, and cost.

13. **Funds Flow and Disbursement Arrangements:** Adequate funds flow arrangements have been agreed upon during negotiations. The financing will be disbursed by the World Bank in line with the World Bank Disbursement Guidelines for IPF (Dated February 2017), and using the advance, direct payment, reimbursement, and special commitment disbursement methods. Additional detailed procedures are included in the Disbursement and Financial Information Letter. The IFR projection method of disbursement will apply to the project. Other methods of disbursement will include advances, direct payments, special commitments, and reimbursements. Payments made against advances would be secured against bank guarantees by a commercial bank and or bonds acceptable to the World Bank.

14. **Staffing:** The FM arrangements for the already established PFMU is headed by the Director of Donor Financed Projects who is a Chartered Accountant with vast experience with the World Bank's FM rules. The PFMU also has the Deputy Director for Donor Financed Projects and the Internal Auditor who are Chartered Accountants as well as other qualified staff (Project Accountants) who will be responsible for the implementation of the project financially under the supervision of the Director and his deputy. The project will contribute to the operating cost of the PFMU (salaries and operational costs) that will be shared on pro-rata basis among the projects at the PFMU.

15. **External Audit Arrangements:** Annual audits will be conducted at the end of each government of Liberia fiscal year for the project. The General Audit Commission (GAC) will conduct the external audit as required by law. Alternatively, other Independent and qualified audit firms, acceptable to the World Bank, would be selected to carry out the audit of the project. The selection of other auditors other than GAC shall be on competitive basis and in accordance with the World Bank's Procurement Regulations and would be selected within six months of project effectiveness. The ToR of the auditors will be cleared by the World Bank. The project financial statements including movements in the DAs will be audited in accordance with International Standards of Supreme Audit Institutions when conducted by the GAC or International Standards on Auditing when conducted by other firms and a single opinion will be issued to cover the project financial statements in accordance with the World Bank's audit policy. The auditors' report and opinion in respect on the financial statements, including the management letter, would be furnished to the World Bank within six months after the end of each fiscal year.

16. **Support to PFMU:** The project will contribute to the operational expenses of the PFMU on pro-rata basis, the same way the other projects are contributing.

17. **Conclusion:** The overall FM risk is assessed as 'High' but reduced to a residual risk rating of 'Substantial' in view of the risk-mitigation measures to be put in place. These include the use of the FM system of PFMU, management of the FM services by the existing Director and his deputies who have experience in World Bank-financed projects, and the strengthening of on-the-job training to be provided for the Internal Auditors and the Project Accountants.

Table A1.4. FM Action Plan

Action Item	Due Date	Responsible
Update the current accounting manual	Two months after effectiveness	LEC/PFMU
PFMU to Customize the existing accounting software to include the account of the new project to generate the Interim Financial Reports (IFRs) and financial statement	Two months after effectiveness	
Recruit external auditors	Six months after effectiveness	
Update and adopt LEC PIM	Two months after effectiveness	
Recruit FM officer	Two months after effectiveness	RCU
Prepare and adopt ROM	Two months after effectiveness	LEC

18. **Supervision Plan:** FM supervision would be conducted consistent with the risks rating for the project. The FM supervision missions' objectives will include reviewing the expenditure for eligibility, availability of supporting documentation and adequacy for documentation.

Table A1.5. Risk Rating Summary Table

	Risk	Risk Rating	Risk Mitigation Measure	Conditions of Board or Effectiveness (Yes or No)	Residual Risk rating
INHERENT RISKS					
1	**Country Level** Weaknesses in legislative scrutiny, low human capacity, declining revenues and energy challenges affecting timely and adequate intergovernmental fiscal transfers.	H	The government revised recently the Project Financial Management (PFM) act, it is in the process of developing PFM strategy and related action plan and is being supported by donors, including the World Bank.	No	H

	Risk	Risk Rating	Risk Mitigation Measure	Conditions of Board or Effectiveness (Yes or No)	Residual Risk rating
2	**Entity Level** The political arm of the Entity and / or Management may unduly interfere with, and/or override, project FM controls. Weak capacity at local councils leads to inadequate FM performance with a lack of internal control and unreliable reporting over the use of project funds.	H	An independent project FM team with officers paid by the project will manage the fiduciary aspects of the project to provide increased independence. An independent external audit will be carried out annually under the project. Initially, regular six monthly FM reviews will be conducted by the World Bank team to provide support. Fiduciary controls will be enhanced through mitigation measures to address control risks outlined below, including: -Boosting Internal Audit support by expanding the scope of project dedicated internal auditor -World Bank enhanced supervision	No	S
3	**Project Level** Weak FM capacity could result in slow execution of the project and delayed reporting could impact on progress.	H	An FM team situated in the PFMU will comprise qualified personnel that will handle the day-to-day management for the project World Bank FM support will be provided to enhance FM policies and procedures and provide training and FM supervision will be regular (at least six monthly).	No	S
			CONTROL RISKS		
4	**Budgeting** AWPB preparation does not reflect a comprehensive and adequate plan of efficient and economic expenditure to achieve results for use in control of the use of funds. Caused by delay in preparations and inadequacy in a) level of activities covered (i.e., comprehensiveness), and reliability of unit/total costs. Poor budget monitoring can lead to budget overruns.	S	The Annual Work Plan would be submitted annually before implementation starts for review by the World Bank which would ensure it is realistic and unit cost estimates are reasonable based on industry and global experiences gathered in some jurisdictions that have undertaken similar operations and also cross check the same with the local market. Also, budget execution reporting through quarterly IFRs will be routinely monitored by the World Bank with variations in unit costs tracked to ensure major deviations are followed up and investigated. The Budget Office will also monitor budgeted activities to ensure effective use of budgets	No	M
5	**Accounting** An accounting system that is incapable of accurately recording project transactions	H	Effective installation and training on SUN system will support improvement, having dedicated FM Staff hired to the project boosting PFMU capacity. The Financial	No	S

	Risk	Risk Rating	Risk Mitigation Measure	Conditions of Board or Effectiveness (Yes or No)	Residual Risk rating
	in a timely manner resulting in unreliable, untimely financial information and difficulties in assessing the financial status of the project and how financial resources have been consumed.		Procedures Manual will be revised to provide comprehensive guidance on accounting. The World Bank will provide support to relevant project staff at PFMU.		
6	**Internal Control** Internal controls in place for the project are insufficient in coverage and/or design to detect the improper use of project funds. No system to monitor internal controls to ensure they are functioning as intended including addressing external audit recommendations.	H	Clearly defined internal control framework documented in PFMU FM Manual that is subject to regular control by a project dedicated Internal Auditor in the PFMU and functionally reporting to the Ministry of Finance Internal Audit Directorate. Training to be conducted for FM staff to enhance knowledge and capacity to perform key internal controls well. Internal Audit plan for first cycle to be submitted to World Bank for input. Internal audit reports will be shared with the World Bank.	No	S
7	**Fund Flow** Inadequate funds flow to implement the project effectively. Transfers to the project are not properly authorized. Project funds are not adequately safeguarded, and cash transactions of the project are not able to be accounted for in a complete, accurate and timely manner.	S	The PFMU will be responsible for preparing and submitting withdrawal applications. IDA funds will be disbursed through the US$-denominated DA to be opened by the PFMU. Simplified flow of funds arrangements will be included in the FM Manual. Dedicated FM staff and training, as noted above, will support adequate funds flow for the project.	No	M
8	**Financial Reporting** Financial reports of the project are unreliable and/or outdated resulting in difficulties in a) timely assessment of the financial performance of the project, and b) project management accountability for the proper use of projects funds.	S	Project will have dedicated FM staff recruited to the PIU to enhance PFMU capacity and the Sun System will be used to track and monitor expenses. All the FM staff will be trained on the World Bank procedures.	No	M
9	**Auditing** The audit will not detect significant improper use of project funds, non-compliance with World Bank requirements, and/or internal	S	The audit ToR will be agreed, and General Auditing Commission will conduct the audit. The audit would be done in accordance with International Standards of Supreme Audit Institution promulgated by the International Organization of Supreme	No	M

	Risk	Risk Rating	Risk Mitigation Measure	Conditions of Board or Effectiveness (Yes or No)	Residual Risk rating
	control weaknesses.		Audit Institutions. After the audit the client will be required to prepare an audit implementation plan which will show who will be responsible for implementing each recommendation and gives a deadline on when it will be implemented. The World Bank will liaise closely with implementing agencies during FM supervision to ensure that management takes corrective actions on identified weaknesses in internal controls.		
OVERALL RISK RATING		H			**S**

H —High, S — Substantial, M — Moderate and L — Low.

Sierra Leone

19. FM assessment of the Finance Unit of the PIU of EDSA was undertaken in August 2022. The objective of the assessment was to determine whether the proposed FM arrangements for the project are acceptable. The FM arrangements for the project cover the system of planning and budgeting, accounting, internal controls, funds flow, financial reporting, and auditing. FM arrangements are acceptable if they are considered capable of recording correctly all budgets, transactions, and balances, supporting the preparation of regular and reliable financial statements, safeguarding the entity's assets, and are subject to auditing arrangements acceptable to the Word Bank

20. **Country Issues:** Country issues that potentially impact project FM include the PFM environment. Sierra Leone's PFM arrangements were assessed in 2021 using the Public Expenditure Financial Accountability PFM Performance Measurement Framework. On-going PFM reform efforts are based on the 2018-2021 PFM reform strategy which has five thematic areas, namely: (i) strategic policy and budgeting; (ii) budget execution, execution, reporting and monitoring; (iii) revenue administration, policy, accounting, forecasting and transparency; (iv) strengthening local government finance and decentralization; and (v) PFM oversight and public accountability. This strategy is currently under evaluation and a new strategy is being developed.

21. The summary risk analysis presented below is based on the assessment of country risks and project's proposed FM arrangements.

Table A1.6. Key FM summary risks and mitigation measures – (EDSA)

Risk		Risk rating	Risk mitigating measures	Conditions of Board or Effectiveness (Yes or No)	Residual Risk rating
INHERENT RISKS					
1	**Country Level**	H	Efforts are being made to help GoSL	No	H

Risk		Risk rating	Risk mitigating measures	Conditions of Board or Effectiveness (Yes or No)	Residual Risk rating
	Weaknesses in legislative scrutiny, low human capacity and energy challenges affecting timely and adequate intergovernmental fiscal transfers.		substantially resolve and enhance revenue management framework in the medium term. The Public Financial Management Improvement and Consolidation Project sought to address the human capacity issues including FM capacity and improve process aspects.		
2	**Entity Level** Management may unduly interfere with, and/or override, project financial management controls.	H	An independent project financial management unit with officers paid by the project will manage the fiduciary aspects of the project to ensure independence. An independent external audit will be carried out annually under the project. The design of the project will include an enhanced accountability framework to ensure control of soft expenditures from possible abuse. Initially, regular FM reviews will be conducted by the World Bank to provide support.	No	S
3	**Project Level** Weak FM capacity could result in slow execution of the project and delayed reporting could impact on progress.	H	The PIU will be manned by qualified personnel that will handle the day-to-day management for the GoSL. The performance of the staff hired in the Unit will be reviewed annually to act as a basis for renewal of their individual contracts.	No	S
CONTROL RISKS					
4	**Budgeting** Budget and annual work plan preparations may be delayed and may not be comprehensive. Risk of cost overruns and adverse variations in expenditure could arise due to potential slow implementation and padding of the related unit costs of goods and services entailed in the implementation.	S	The Annual Work Plan would be submitted annually before implementation starts for review by the World Bank team which would ensure it is realistic and unit cost estimates are reasonable based on industry and global experiences gathered in some jurisdictions that have undertaken similar operations and also cross check the same with the local market. Also, budget execution reporting through quarterly IFRs will be routinely monitored by the World Bank with variations in unit costs tracked to ensure major deviations are followed up and investigated. The Budget Office will also monitor budgeted activities to ensure effective use of budgets	No	M

Risk		Risk rating	Risk mitigating measures	Conditions of Board or Effectiveness (Yes or No)	Residual Risk rating
5	**Accounting** Government Accounting System not yet installed at the Unit. Use of manual accounting system not generating reliable, accurate and timely accounting information for project appropriate decision making acceptable to the World Bank.	S	The PIU will use Quick Book accounting system and ensure compliance with its Financial Management Manual. The World Bank will provide support to relevant project staff at PIU.	No	M
6	**Internal Control** Project funds not being used for intended purposes because of inadequate internal control by management, lack of control measures and absence of internal audit.	S	Adequate internal control over the disbursement and accountability of funds for eligible expenditures will be further strengthened by the adoption of an enhanced accountability framework for the project and internal audit oversight on the project at PIU will be instituted. The internal auditors of EDSA will be required to generate quarterly internal audit reports which should be shared with relevant stakeholders including the World Bank. The internal controls will also be documented in the FM manual for the project. Internal and external auditors would be expected to clearly identify and report any cases of breach of internal control procedures by the project management.	No	M
7	**Fund Flow** Possible delays in processing withdrawal applications leading to problems in honoring payments to third parties. Submission of Withdrawal Applications delayed.	S	The PIU will be responsible for preparing and submitting withdrawal applications, and acceptable service standards for settlement of bills will be established. IDA funds will be disbursed through the US$-denominated DA to be opened by the PIU. Simplified flow of funds arrangements will be included in the PIM.	No	M
8	**Financial Reporting** Delays in the preparation and submission of un-audited IFRs and/or unreliable IFRs submitted.	S	IFRs shall be submitted to the World Bank within 45 days after end of each calendar quarter. The content of the IFR will include Sources and Uses of Funds, Uses of Funds by Category, bank accounts reconciliation and a schedule of amounts drawn. The World Bank's FM team will review the quality of IFRs and make recommendations, and provide training,	No	M

Risk		Risk rating	Risk mitigating measures	Conditions of Board or Effectiveness (Yes or No)	Residual Risk rating
			as required.		
9	**Auditing** Delays in the submission of audit reports and the timeliness of management follow up on audit issues	S	The audit ToR will be agreed, and a qualified and acceptable auditor appointed with relevant input of Audit Service Sierra-Leone. Continuous satisfactory performance of auditors will be basis for continuous engagement. The audit would be done in accordance with International Standards on Auditing and, International Public-Sector Accounting Standards. The audited financial statement is expected to be submitted to the World Bank not later than six months after the end of each fiscal year. The ToR for the external auditors has to be cleared by the World Bank. The World Bank will liaise closely with implementing agencies to ensure that management takes corrective actions on identified weaknesses. The World Bank FM team will also provide training to external auditors to support improvements in audit quality.	No	M
OVERALL RISK RATING		H			S

H —High, S — Substantial, M — Moderate and L — Low.

Financial Management Arrangements

22. **Budgeting Arrangements.** The respective entities' Annual Work Plans and Budgets (AWPB) will be prepared and approved based on the policy guidelines and strategy planning as will be laid-out in the PIM and consistent with the provisions of the Public Financial Management Act 2016. The budget will be activity based and in line with the cost tables of the project. The AWPB is expected to be prepared in a participatory way and will be approved before each new financial year begins in January. The approved AWPBs should be submitted to the World Bank not later than November 30, of each Fiscal Year during the implementation of the project. Actual expenditure, including a comparison to budget, will be monitored during project implementation using unaudited interim financial reports**.** Finance Unit of the PIU EDSA will ensure timely preparation, review, consolidation, and approval of the AWPB.

23. **Accounting Arrangements.** The Finance Unit of the PIU of EDSA will utilize Quick Books accounting software to record transactions and prepare financial reports. The Finance Unit will set up and maintain books of accounts specifically for this project enabling it to prepare IFRs and annual financial statements in accordance with requirements. Books of accounts will include a main cash book, and ledgers, fixed asset registers, and contracts register. The Finance Unit of the PIU of EDSA is headed by a qualified accountant with over four years' experience with World Bank-financed projects assisted by an accounting graduate

also with over four years' experience with World Bank-financed projects. The project will recruit a Financial Management Assistant that will be dedicated to this project. All implementation support staff members of this project will be contracted on terms and conditions consistent with requirements published by the Ministry of Finance. Salaries of the staff members will be apportioned to the project in relation to the number of World Bank-financed projects in respect of which they provide their services.

24. The accounting systems will contain: (i) a chart of accounts and a coding system capable of capturing transactions classified by project components and disbursement categories as well as against budget lines; (ii) use of the cash method of accounting; (iii) a double entry accounting system; and (iv) the production of annual financial statements and quarterly unaudited IFRs in a format acceptable to the World Bank.

25. The accounting policies and procedures manuals will include the project financial transactions procedures at each of the implementing agencies. The Manuals will contain the necessary internal controls including internal checks and segregation of duties.

26. **Internal control and Internal Audit.** The Internal Auditors of EDSA will carry out periodic internal audit reviews of project's activities of EDSA and share copies of their report with the World Bank.

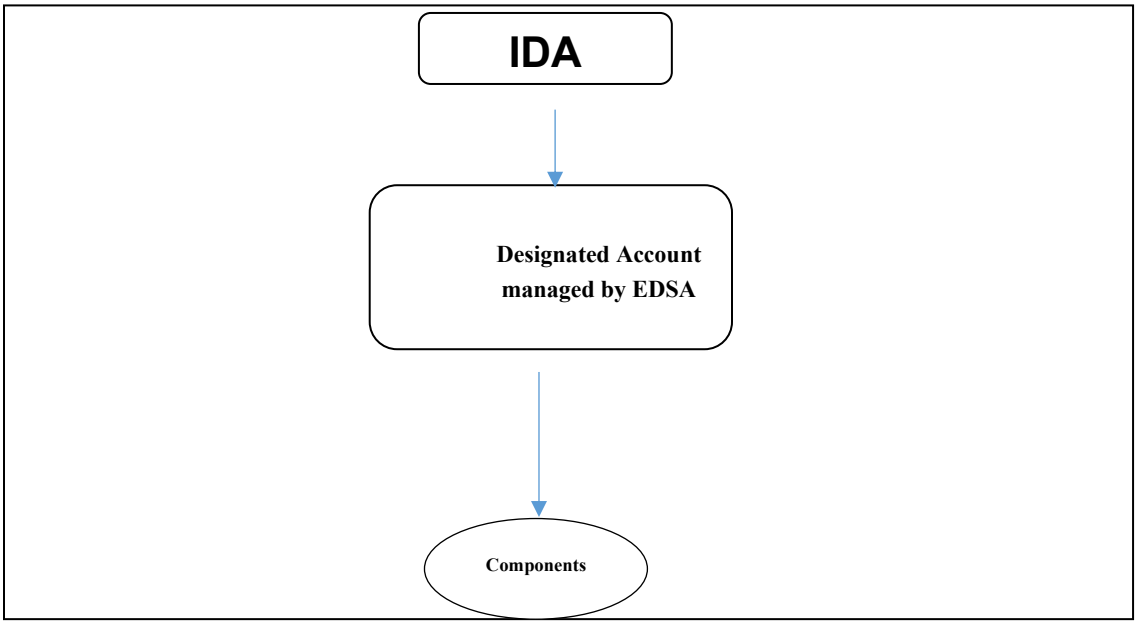
27. Segregation of duties, and full compliance with the provisions of the PIM, especially as pertaining to internal control aspects, will remain a key ingredient in the implementation of the expenditure processing activities at the Finance Unit of the PIU of EDSA and the implementing and executing agencies during the life of the project. Given that the project includes significant investment in network assets and solar power assets and the associated risks, mitigating measures such as retention monies, asset verification, will be placed and reflected in the project's accounting and finance manual to be included in the PIM. The Internal Auditor will devote enough time and effort to the assets to ensure the controls are effective.

28. **Governance and Anti-Corruption.** The World Bank's Anti-Corruption Guidelines *("Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants",* dated October 15, 2006 and revised in January 2011 and as of July 1, 2016) apply to this operation. Sections of these guidelines, especially those relating conflict of interest, procurement and contract administration monitoring procedures, procedures undertaken for replenishing the DA and use of the project's asset shall be provided as an annex to the project's Financial Procedures Manual. Additional mitigation measures will include advocating good governance, close monitoring, and spot checks by the internal audit units of the implementing entities, as well as enhanced social responsibility by the GoSL and implementing entities.

Fund flow arrangements

29. **Bank Accounts:** A DA denominated in US dollars opened by EDSA to finance activities implemented by EDSA.

Figure A1.1. Illustrative Funds Flow Arrangements



Disbursement Arrangements

30. The Report – based disbursement method will be used as a basis for the withdrawal of credit and grant proceeds. A forecast of the first 6 months expenditures will form the basis for the initial withdrawal of funds from the grant, and subsequent withdrawals will be based on the net cash requirements. The project provides for the use of 'advances, reimbursements, direct payment, and special commitments' as applicable disbursement methods, and these will be specified in the disbursement letter.

31. Supporting documentation will be retained by the implementing agencies for review by the World Bank implementation support missions and external auditors. The Recipient will be obligated to refund the World Bank for any ineligible expenditure paid from the DAs. The Recipient may be requested to refund the World Bank for the amounts advanced to the DAs if these remain inactive for more than six months. As reflected in the FA, the World Bank may suspend disbursement of funds if reporting requirements are not met.

Financial Reporting Arrangements

32. EDSA will be responsible for the preparation and submission of quarterly IFRs for the project, to be submitted within 45 days after the end of the quarter to which they relate. It will also be responsible for the preparation of the annual financial statements for the fiscal period to which they relate and having them audited. The information in these reports will be clearly linked with the chart of accounts for the Project.

33. The following quarterly IFRs and annual Financial Report will be produced:

(a) A statement of sources and uses of funds for the reported quarter and cumulative period from project inception, reconciled to opening and closing bank balances and classified according to the withdrawal categories shown in the FA.
(b) A statement of uses of funds (expenditures) by project activity/component comparing actual expenditures against budget, with explanations for significant variances for both the quarter and cumulative period. The amounts presented should be reported for each financing account and expenditures which are reported by EDSA should be shown separately.

34. The annual financial statements should be prepared in accordance with International Public Sector Accounting Standards: Financial Reporting Under the Cash Basis of Accounting and International Standard on Auditing within six months after the end of each fiscal year.

35. The FA will require the submission of audited financial statements to the World Bank within six months after the end of each financial year. These Financial Statements will comprise:
(a) a Statement of Cash Receipts and Payments, which recognizes all cash receipts, cash payments, and cash balances controlled by the project entities and separately identifies payments by third parties on behalf of the project entities;
(b) a comparison of budget and actual amounts either as a separate additional financial statement or as a budget column in the statement of cash receipts and payments provided the budget is made public;
(c) the Accounting Policies Adopted and Explanatory Notes. The explanatory notes should be presented in a systematic manner with items on the Statement of Cash Receipts and Payments being cross-referenced to any related information in the notes. Examples of this information include a summary of fixed assets by category of assets and listing individual withdrawal applications; and
(d) A Management Assertion that IDA funds have been expended in accordance with the intended purposes as specified in the relevant World Bank legal agreement.

36. Indicative formats of these statements will be developed in accordance with fiduciary requirements and agreed with the Country Financial Management Specialist.

External Audit Arrangement

37. The Audit Service Sierra Leone (ASSL) is by law responsible for the audit of all government finances and projects. However, in view of the prevailing capacity constraints, it is likely that the ASSL could outsource such service to a private firm of auditors with qualifications and experience acceptable to the World Bank.

38. EDSA will be responsible for preparing the project financial statements on which the auditor will issue a single opinion covering project accounts, the usage of statement of expenditures, and the management of DAs. In addition, a management letter outlining any internal control weaknesses will also be issued by the external auditor together with the audit report and the PIU will be required to prepare a remedial action plan to accompany the submission of the audited accounts.

39. The annual financial statements should be prepared in accordance with International Public-Sector Accounting Standards: Financial Reporting Under the Cash Basis of Accounting and will be audited in accordance with International Standard on Auditing and submitted to the World Bank within six months after the end of each fiscal year.

40. The audit will be conducted by independent auditors acceptable to the World Bank based on TORs acceptable to the World Bank as above annotated. The auditors should be appointed prior to the first audits period to allow the auditors able to submit the audit report within the due date. The audited financial statements will be submitted to the World Bank within six months after the end of each fiscal year. The cost of the audit will be financed from the project proceeds.

Financial Management Action Plan

41. Table A1.7 below shows the financial management action plan for the Project.

Table A1.7. FM Action Plan

Action	Due Date	Responsible
Preparation of the PIM incorporating the FM policies and procedures	Two months after effectiveness	EDSA
Prepare and adopt ROM	Within two months after effectiveness	
Update and adopt the EDSA PIM("EDSA PIM")	Within two months after effectiveness	
Recruitment of FM Assistant	Three months after effectiveness	
Recruitment of external auditor	Within six months after effectiveness	
Agree on IFR format and audit ToRs	Done	

Conclusion of the Assessment

42. The conclusion of the assessment is that the EDSA's PIU has adequate systems to manage the IDA project funds. The overall FM residual risk of the Project is **Substantial.**

Chad

43. The project will be implemented by the SNE ("*Société Nationale d'Electricité*") PIU. The financial management assessment of the project institutional setup identified some risks and develop mitigation measures. The FM assessment was carried out in accordance with the Financial Management Manual for World Bank IPF Operations that became effective on March 1, 2010 and was last revised on February 9, 2017. After implementing the proposed mitigation measures and actions, the financial management arrangements of the PIU would satisfy the World Bank's minimum requirements under World Bank Policy and Procedure for IPF operations and provide, with reasonable assurance, accurate and timely information on the status of the project as required by the World Bank. The assessment concluded that after implementing the proposed mitigation measures, the financial management residual risk is Substantial.

44. **Budgeting**. The annual project budgets will be based on a Procurement Plan agreed with the World Bank, developed by the SNE PIU, and approved yearly by the Project Steering Committee and the World Bank and will be available by November 30 each year. Budget implementation will be monitored through the consolidated quarterly unaudited interim financial reports (IFRs).

45. **Fund flow**. The PIU will open a DA in a commercial bank under terms and conditions acceptable to the World Bank. The DA will be managed according to the disbursement procedures described in the FM Procedures Manual, the Disbursement and Financial Information Letter (DFIL). The initial advance to the DA would cover approximately four months of expenditures and would be specified in the DFIL. The minimum value of direct payment and special commitment is 20 percent of outstanding advance made to the DA. Disbursement procedures arrangement will be detailed in the FM Procedures Manual and the DFIL. Replenishment through Statements of Expenditures, Direct Payment methods, and special commitments will apply to the project. The option to disburse against the submission of semi-annual unaudited IFRs (also known as the report-based disbursements) could be considered, as soon as the project meets the criteria.

46. **Accounting and financial reporting**. The SNE PIU will maintain books of accounts in a computerized environment. The PIU will use an FM Manual to guide staff on internal control principles. Separate ledger accounts will be opened for the project in the accounting system, and a chart of accounts will be configured to classify expenditures based on project components/major activities. IFRs on the use of funds will be submitted to the World Bank by the PIU within 45 days from the end of each calendar quarter. The expenditure statements/ledger accounts generated from the accounting system will be used for the preparation of the consolidated IFRs.

47. **Staffing**. Under the ongoing CCPIP (P168185) and Energy Access Scale Up project (P174495), the SNE PIU is staffed with satisfactory to the Bank FM experts, including a finance officer, an accountant, while the internal auditor will be recruited at a later stage. In support of the RESPITE project, SNE will recruit an additional accountant within three months of project effectiveness. Adequate provision for staff costs will be made in the project budget. The project FM staff will be provided the requisite training on WBG FM and disbursement procedures.

48. **Internal audit and controls**. The PIU will prepare a Project FM manual and a PIM documenting the project implementation arrangements and controls to ensure (i) that the project funds are used only for the intended purposes along economy and efficiency principles; (ii) the preparation of accurate, reliable, and timely periodic financial reports; and (iii) that the project's assets are adequately safeguarded. The internal auditor to be recruited by the SNE PIU under the CCPIP and the Energy Access Scale Up project will include the RESPITE in its annual work plan.

49. **Implementation Support and Supervision Plan**. FM implementation support intensity and frequency will be in line with risk-based approach and will involve a collaborative approach with the entire Task Team. A first comprehensive implementation support mission will be performed six months after the project effectiveness. Afterwards, the missions will be scheduled depending on risk and will include the following diligences: (i) monitoring of the financial management arrangements during the supervision process at intervals determined by the risk rating assigned to the overall FM Assessment at entry and subsequently during Implementation (ISR); (ii) integrated fiduciary review on key contracts; (iii) review the IFRs; and (iv) review the audit reports and management letters from the external auditors and follow-up on material accountability issues by engaging with the Project task team leader, Recipient, and/or Auditors; the quality of the audit (internal and external) also is to be monitored closely to ensure that it covers all relevant aspects and provide enough confidence on the appropriate use of funds by recipients.

Table A1.8. FM Action Plan

Actions	Due date	Responsible
Recruit a senior accountant fully dedicated to the project	Within three months of effectiveness	SNE
Tailor current accounting system in use by SNE PIU under the Cameroon-Chad Power Interconnection Project (*Projet d'Interconnexion des Réseaux Electriques du Cameroun et du Tchad*, PIRECT, P168185) and Chad Energy Access Scale Up project (P1774495)	Within three months following effectiveness	
Update the current FM manual in use for the ongoing World Bank-financed project (Chad Access project)	Within three months following effectiveness	
Update the ToRs of the internal auditor recruited under the ongoing World Bank-financed projects (PIRECT, Chad Access Project) to include internal audit of the proposed project (RESPITE)	Within three months following effectiveness	
Prepare and adopt ROM	Within two months after effectiveness	
Update and adopt the SNE Project Implementation Manual PIM	Within two months after effectiveness	
Recruit an independent external auditor, with ToR and qualifications acceptable to the World Bank	Within six months following effectiveness	

Togo

Financial Management

50. Togolese Agency for Rural Electrification and Renewable Energy (*Agence togolaise d'électrification et des énergies renouvelables*, AT2ER) through its PIU, will be responsible for implementation, supervision, and coordination of the project, including FM, organizational aspects, and M&E. It was agreed that Liberia PFMU will be responsible for high level fiduciary management of this project, as required for all donor-funded projects domiciled in the country. An FM assessment was conducted for AT2ER, the national implementing entity in Togo. The objective of the FM assessment was to determine whether the respective selected PIUs have adequate FM arrangements to ensure that: (i) project funds will be used for purposes intended in an efficient and economical way; (ii) the project financial reports will be prepared in an accurate, reliable, and timely manner; (iii) the project's assets will be safeguarded; and (iv) the project is subjected to a satisfactory auditing process. The review of existing FM systems included budgeting, staffing, financial accounting, financial reporting, fund flow and disbursements, and internal and external audit arrangements.

51. Although AT2ER does not have any past recent experience with the implementation of the Bank-financed projects, it is implementing various projects financed by other development partners, including, including the West African Development Bank (*Banque Ouest Africaine Du Developpement,* BOAD), the European

Union, the German Society for International Cooperation GmbH (*German Society for International Cooperation GmbH*, GIZ), the Islamic Development Bank, Abu Dhabi Fund for Development for International Cooperation…etc. There are already acceptable staffing arrangements with adequate FM tools in place including a FM procedures manual and accounting software to handle the new project. The current FM team at AT2ER is comprised of a qualified and experienced financial management specialist, and two accountants. The financial management arrangements in place at AT2ER satisfy the World Bank's minimum requirements, to provide, with reasonable assurance, accurate and timely information on the status of the project as required by the World Bank once the above proposed mitigation measures are implemented. The conclusion of the assessment was that, due to the proposed mitigation measures, and based on the experience of AT2ER in the implementation of other development partners' financed projects, especially the African Development Bank, the financial management residual risk for AT2ER is Substantial and is expected to be moderate once the mitigation measures are implemented after the project effectiveness date.

52. To accommodate the project in the existing financial management system of AT2ER, and ensure adequate segregation of duties, the following measures should be taken three months after effectiveness: (i) appointing qualified and experienced Accountant within the current FM team of AT2ER; (ii) including in the work plan of the current interna auditor, the activities of the new project; (iii) customizing the existing Tom2Pro accounting software to fit the project's needs; (iv) updating the FM manual of procedures used under AfDB and other development partners' financed projects managed by AT2ERs, to take into account any specificities of the new project; and (vi) recruiting an independent auditor to audit the project's financial statements, within six months after effectiveness.

Budgeting Arrangements

53. AT2ER PIU will prepare an AWPB in accordance with ToRs acceptable to the World Bank. Implementing entities receiving funds from AT2ER PIU will submit their budgets to AT2ER PIU for consolidation. The AWPB will then be approved submitted to the World Bank not later than November 30 of each calendar year throughout the implementation of the project.

54. AT2ER PIU will monitor the project's AWPB execution with the project accounting software in accordance with the budgeting procedures specified in the FM manual of procedures, and they will report on variances along with submitting the quarterly unaudited IFRs. The budgeting system will need to forecast for each fiscal year the origin and use of funds under RESPITE. Only budgeted expenditures will be committed and incurred to ensure that resources are used within the agreed-upon allocations and for the intended purposes. The semi-annual IFRs will be used to monitor the execution of the AWPB.

Accounting Arrangements

55. **Accounting policies and procedures, and information system**. Overall, accounting procedures are adequate for AT2ER PIU. AT2ER PIU will migrate its existing Tom2Pro accounting software not later than three months after project effectiveness date, to reflect the needs of the proposed Project. Any new FM staff in each project implementing entity will be trained to be conversant with the accounting software. The existing FM manual of procedures in use under AfDB and other development partners' financed projects managed by AT2ER PIU will be updated within three months after project effectiveness date to

consider RESPITE context.

56. **Accounting staff**. The FM staff within AT2ER is comprised of an experienced financial management specialist and two accountants without recent experience in managing World Bank-financed projects, but they are familiar with AfDB and other development partners' fiduciary procedures. To accommodate the project in the existing financial management system of AT2ER, and ensure adequate segregation of duties, AT2ER PIU shall appoint within its current FM team, a qualified and experienced accountant, within three months after effectiveness. All accounting staff will be trained in World Bank FM and Disbursement procedures as well as in the use of the Project accounting software.

57. **Accounting standards and basis**. The AT2ER PIU will use the current SYSCOHADA accounting system customized for African francophone countries in use for the ongoing World Bank-financed projects implemented in Togo.

Internal Control and Internal Audit Arrangements

58. **Internal controls**. The internal control procedures will be documented in the FM manual of procedures in use under the AfDB and other development partners' financed projects managed by AT2ER, which needs to be updated within three months after effectiveness, taking into consideration gaps in the existing FM Manuals/Regulations to ensure that project FM arrangements are in line with the FAs. These efforts will ensure that RESPITE has an effective internal control system covering the procedures required to support activities under different components.

59. **Internal audit**. Robust internal audit arrangements are in place at AT2ER. AfDB and other development partners' financed projects managed by AT2ER have been audited by an internal auditor appointed by AT2ER within its internal audit department. Within three months after project effectiveness date, AT2ER will include in the work plan of its current internal auditor, the activities of the new project. The Internal Audit of RESPITE will be conducted using a risk-based approach, and the internal audit will be required to submit at least two internal audit reports to the World Bank each year.

Governance and Anti-Corruption Arrangements

60. AT2ER PIU will follow the institutional rules/regulation/ guidelines/policies and procedures in place at AT2ER. FM arrangements will ensure that there are internal control systems in place and audits conducted to prevent and detect fraud and corruption. Transparency and accountability are highly encouraged by putting the project budget and audited financial statements on the project implementing entity's websites where applicable. Complaint-handling mechanisms should also be set up by AT2ER PIU so that beneficiaries who are not receiving services as planned have a mechanism to raise their complaints and ensure that they are followed up and addressed. This will involve putting a system in place to record all complaints received, direct them to the person responsible for addressing them, and record when a response is sent to the complainant. RESPITE must also comply with the World Bank Anti-Corruption Guidelines.

Funds Flow Arrangements

61. **Designated and Project Accounts**. AT2ER PIU will open a DA in a commercial bank on terms and conditions

acceptable to the World Bank. The signatories to these bank accounts should be in line with the FM manual of procedures. Payments to eligible expenditure will be made from the DA.

62. **Disbursements**. AT2ER PIU will access funding from the World Bank using the disbursement methods described in the World Bank Disbursement Handbook (that is, advance, direct payment, reimbursement, and special commitments). Detailed disbursement procedures will be documented in the FM manuals of procedures. Upon Credit effectiveness, AT2ER PIU will be required to submit a withdrawal application for an initial deposit to the DA, drawn from the IDA Credit, in an amount to be agreed to in the DFIL. Further deposit of funds from IDA to the DA will be made upon evidence of satisfactory utilization of the advance, reflected in Statements of Expenditure. Withdrawal applications must be submitted regularly (at least once a month). If ineligible expenditures are found to have been made from the DA, the Borrower will be obligated to refund the same. If the DA remains inactive for more than three months, the World Bank may reduce the amount advanced. The World Bank will have the right, as reflected in the terms of the FA, to suspend disbursement of the funds if significant conditions, including reporting requirements, are not complied with. Additional details regarding disbursement will be provided in the disbursement letters.

Financial reporting arrangements

63. AT2ER PIU will prepare quarterly unaudited IFRs in form and content satisfactory to the World Bank, which will be submitted to the World Bank within 45 days after the end of the calendar quarter to which they relate. The frequency, formats, and contents of the IFRs were agreed between the World Bank and AT2ER PIU during negotiations. The contents of the IFR for all implementing entities will include the following information to account for project funds:
    (a) Statement of Sources and Uses of Funds.
    (b) Statement of Uses of Funds by Project Activity/Component.
    (c) DA Activity Statement.
    (d) Bank statements for both the Designated and Project Account and related bank reconciliation statements.
    (e) Summary statement of DA expenditures for contracts subject to prior review.
    (f) Summary statement of DA expenditures not subject to prior review.

64. AT2ER PIU will also prepare annual financial statements for the project within three months after the end of the accounting year, and these statements will comply with accounting standards followed by AT2ER PIU, and World Bank requirements. The audited financial statements will be required to be submitted to the World Bank within six months after the end of the fiscal year

65. AT2ER PIU will use private audit firms that are acceptable to the World Bank; the project will meet the cost of hiring a private audit firm. All audits will be carried out in accordance with International Standards on Auditing. ToRs for each project implementing entity will be agreed with the World Bank. The external auditors must be appointed within six months of project effectiveness date. Audit reports for the project accounts, together with management letters, should be submitted to the World Bank within six months after the end of the government's fiscal year (December 31). The audit reports will be publicly disclosed by the World Bank in accordance with the World Bank disclosure policy. Table below presents the FM Action Plan for RESPITE Togo, with the entity responsible for each action and the completion date.

Table A1.9. FM Action Plan

Action	Due Date	Responsible
Update the FM manual of procedures used under AfDB financed projects managed by AT2ER	Three months after effectiveness	AT2ER
Recruit or appoint qualified and experienced FM officers, and Accountants		
Prepare and adopt ROM	Within two months after effectiveness	
Update and adopt the AT2ER PIM	Within two months after effectiveness	
Appoint within the current FM team of AT2ER, a qualified and experienced accountant to be dedicated to the new project	Three months after effectiveness	
Include in the work plan of the current internal auditor the activities of the new project	Three months after effectiveness	
Customize the existing Tom2Pro accounting software to include the accounts of the new project to generate the IFRs and financial statement	Three months after effectiveness	
Recruit an independent auditor to audit the project's financial statements	Six months after effectiveness	

66. Implementation Support Plan. For FM, implementation support missions will be carried out at least every six months, based on the Substantial FM residual risk rating. Implementation support will also include desk reviews, such as the review of IFRs and audit reports. In-depth reviews and forensic reviews may be done where deemed necessary. The FM implementation support will be an integral part of the project's implementation reviews.

67. **Conclusion.** The conclusion of this assessment is that the FM arrangements in place meet the World Bank's minimum requirements under World Bank IPF Policy, and therefore are adequate to provide, with reasonable assurance, accurate and timely information on the status of the project required by World Bank. The overall FM residual risk rating is **Substantial** for AT2ER PIU and is expected to be **moderate** once the mitigation measures are implemented after the project effectiveness date. The FM residual is rated as **substantial** mainly due to: (i) the lack of experience of AT2ER in managing the Bank financed project; and (ii) risks of by-passing rules and ex-ante controls to speed up procurement and payments because of the context of emergency.

WAPP

68. **Budgeting Arrangements.** The WAPP Secretariat is currently using for the WAPP Integration and TA Project a Manual of Procedures already including detailed budgeting procedures, accounting procedures, the preparation of annual work plan, and anti-corruption principles which will be used for the RESPITE. Annual

work plans and the budgets will be submitted to the World Bank for no objection not later than November 30 of each year preceding the year the work plan should be implemented.

Accounting and Reporting Arrangements

69. **Accounting policies and procedures**: The manual of procedures of the WAPP Secretariat is currently using for the WAPP Integration and TA Project (Grant No: H770-3A, WAPP APL4 (phase 1) - Côte d'Ivoire, Sierra Leone, Liberia, and Guinea Power System Re-development Project (P113266)) details the accounting systems, policies, and administrative and financial procedures which is acceptable to the World Bank. It will be used for RESPITE operation.

70. **Accounting staff:** The WAPP financial department consists of a Director of Finance and four accountants:(i) WAPP accountant; (ii) Accountant for budgeting; (iii) accountant for treasury; and (iv) project accountant. For the project purpose the staffs involved in the day- to-day management are the Director of finance, accountant for treasury and the project accountant what are enough to properly manage the two projects. As we understood that the Integration and Technical Assistance Project (ITAP) project activities will be transferred to RESPITE.

71. The WAPP Secretariat should ensure that these staffing maintain accounting records related to project financed transactions, and to prepare the project's financial reports on time. Additional qualified and experienced accountant could be recruited through a competitive process in compliance with the World Bank's Procurement Regulations to reinforce the WAPP FM team when needed. The team will have the overall FM responsibility over budgeting, accounting, financial reporting, flow of funds, internal control, and auditing. The FM staff's capacity can be reinforced over the RESPITE implementation period through the rolling out of a training plan that includes sessions on the World Bank disbursement procedures and financial reporting arrangements, among others.

72. **Accounting information systems software**: The accounting software (TOMPRO) acquired under the existing projects will be used for the RESPITE project. This accounting software has multi-projects, multi-sites and multi-donor features, and is customized to generate its financial reports. So, no need to acquire new accounting software, however, it can be upgraded if necessary.

73. **Accounting standards**: The WAPP Secretariat is using International Public-Sector Accounting Standards principles. These standards are going to be apply to the RESPITE project.

Internal Control and Internal Audit Arrangements

74. **Internal controls**. The manual of procedures of the WAPP Secretariat is currently using for the two existing projects details internal control measures which are acceptable to the World Bank. It will be used for RESPITE operation. It could be revised to take into account the new project activities features.

75. **Internal audit**. The internal audit arrangement the WAPP Secretariat is currently using for the WAPP two existing projects despite that we noted some shortcomings in the internal auditor work. For example, the 2021 of the existing projects were not covered by its work so we did not receive any reports. The work-program of WAPP Secretariat's Internal Audit Unit will be revised within three months after effectiveness

to include the RESPITE to ensure that the audits are done semi-annually using a risk-based approach with special attention to operations costs, including per diems and other soft expenditures, to ensure they are used in an economical manner and for the purposes intended. These semi-annual internal audit reports need to be submitted to the World Bank within 45 days after the end of the semi-annual period together with the IFR.

76. **Audit Committee**. WAPP Secretariat Finance Committee will conduct the role of audit committee for the RESPITE. This role will need to be reviewed in the updated version of the current manual of procedures the WAPP Secretariat is currently using under existing projects. Audit committees are essential in ensuring that management addresses issues raised by both internal and external auditors. They also provide independence to the Internal Audit Unit which can report to them from a functional perspective while reporting to management from an administrative perspective.

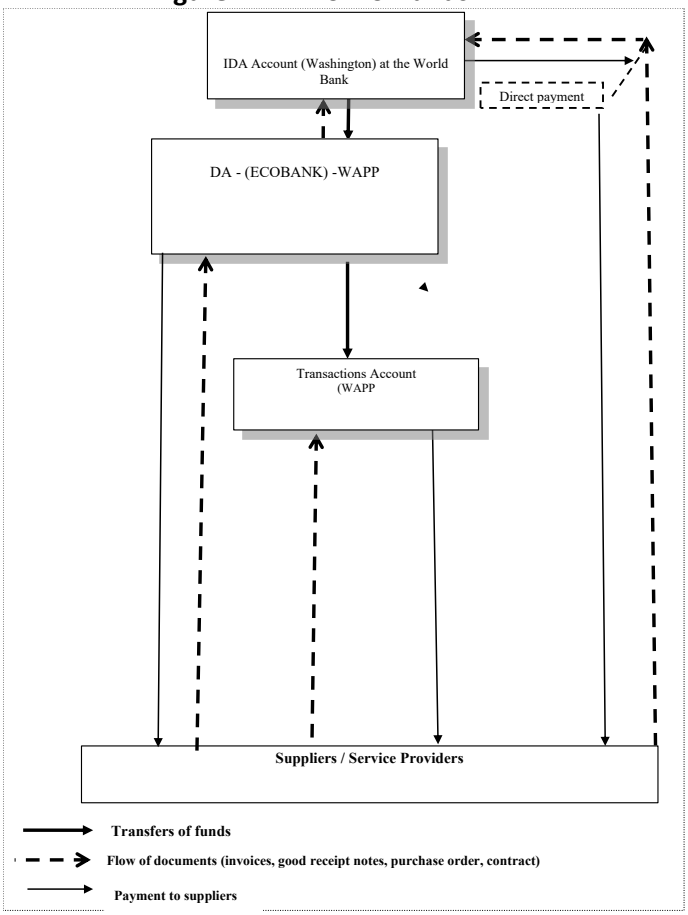
77. **Governance and Anti-corruption arrangements**. To enhance transparency and accountability, the WAPP Secretariat will have to put the project's budget and audited financial statements on its website each year. With respect to dealing with fraud and anticorruption, the World Bank Anti-Corruption Guidelines referred to in the FA will apply.

Funds Flow Arrangements

78. **Designated Account.** The WAPP Secretariat has many banks accountants and is familiarized with the management of Designated and separate transactions bank account. For the purpose of the RESPITE, the WAPP Secretariat will open a DA denominated in US$ Ecobank Benin where the accounts of existing projects are opened. Details of the bank account that is opened and the account signatories should be communicated to the World Bank. A transactions Account can be opened in local currency to make payments of bills expressed in local currency (XoF) to reduce the foreign exchange risk. This transactions bank account will be managed by WAPP according to its manual of procedures

79. **The signatories to the DA**. The signatories to the DA should be in line with WAPP Secretariat's PIM and they should be submitted to the World Bank between the signing of the project and its effectiveness.

Figure A1.2. Flow of funds



80. The operations should be carried out according to the procedures defined in the manual of procedures. Funds received from the World Bank are deposited into the DA opened at Ecobank Benin. The day-to-day payments are made by cash, check and bank transfer. We did not encounter any delayed payment issues with the ongoing projects. On the ongoing projects, we noted that the WAPP FM team was carrying in hand significant cash to make payment when they have activities in the other countries. This situation presents a high risk of theft or misappropriation of the project's funds. We recommend to the team to use the bank transfer or other solutions to avoid carrying the cash in the cars.

Disbursement Arrangements

81. Disbursements under the Project will be transaction-based. In addition to making advances to the DA, other disbursement methods (reimbursement, direct payment, and special commitment) will be available for use under the RESPITE. Further instructions on the withdrawal of proceeds will be outlined in the DFIL and details on the operation of the DA will be provided in the Project Financial and Accounting Manual. The existing internal control arrangements presented in the Manual of Procedures will be applied.

82. **Financial Reporting Arrangements.** The WAPP Secretariat will prepare semi-annual un-audited IFR in form and content satisfactory to the World Bank, which will be submitted to the World Bank within 45 days after the end of the calendar semester. The WAPP will use the same format as the existing project. The semester

IFR should include at least the following information: (i) Statement of Sources and Uses of Funds; (ii) Statement of Uses of Funds by Project Activity/Component; and (iii) DA Activity Statement and explanation notes to the IFR.

83. **External Audit Arrangements**. The WAPP's financial statements and internal control system will be subject to external annual audit by an independent external auditor which will be recruited on ToR acceptable to the World Bank. The external auditor will give an opinion on the annual financial statements in accordance with auditing standards issued by the International Federation of Accountants. In addition to audit reports, the external auditor will also produce a management letter on internal control which would identify specific deficiencies and areas of weakness in systems and controls and make recommendations to improve them. The management letter would also report on instance of noncompliance with terms of the FA. The project will be required to submit, not later than six months after the end of each fiscal year, the annual audited financial statements of the previous year. In line with the new access to information policy, the WAPP will comply with the disclosure policy of the World Bank of audit reports (for instance making available to the public without delay after receipt of all reports final financial audit, including audit reports qualified) and place the information on its official website within one month after acceptance of final report by the World Bank.

Table A1.10. FM action plan

Action	Due Date	Responsible
Update project software parameters for RESPITE	Three months after effectiveness	WAPP
Recruit an independent auditor to audit the project's financial statements	Six months after effectiveness	
Prepare and adopt the WAPP PIM	Within two months after effectiveness	

84. **Implementation Support Plan**. FM implementation support missions will be carried out at least once a year based on the Moderate FM residual risk rating. Implementation Support will also include desk reviews such as the review of the IFRs and audit reports. In-depth reviews and forensic reviews may be done when and when deemed necessary. The FM implementation support will be an integrated part of the project's implementation reviews.

Table A1.11. FM implementation support

FM Activity	**Frequency**
Desk reviews	
IFRs review	Semester
Audit report review of the project	Annually
Review of other relevant information such as interim internal control systems reports or internal audit /IGF reports	Continuous as they become available
On site visits	
Review of overall operation of the FM system	Once per year (Implementation Support Mission)
Monitoring of actions taken on issues highlighted in audit reports, auditors' management letters, internal audit and other reports	As needed

FM Activity	Frequency
Transaction reviews (if needed)	As needed
Capacity building support	
FM training sessions	During implementation and as needed.

85. **Conclusion**. The conclusion of the assessment is that the FM arrangements in place meet the World Bank's minimum requirements under World Bank Policy and Procedure for IPF and therefore are adequate to provide, with reasonable assurance, accurate and timely information on the status of the project required by the World Bank. **The overall FM risk the residual is rated Moderate as the project implementing entity has experience in management of the World Bank-financed project**.

86. **Fiduciary Risks and Mitigation Measures.** The FM risk assessment and mitigations measures are summarized in the table below:

Table A1.12. Risk assessment and mitigation measures

Risk	Risk Rating	Risk Mitigating Measures Incorporated into Project Design	Conditions for Effectiveness (Y/N)	Residual Risk
Inherent risk				
Country FM arrangements fall under organizations not directly influenced by issues at country level	M	Continue to monitor and raise any issue to the authorities.	N	M
Entity level The entity is already implementing World Bank funded project. Therefore, entity's internal procedures are well tailored to suit with the World Bank procedures.	M	The WAPP's team is familiar with the World Bank procedures.	N	M
Projects The projects key activities will be implemented outside the WAPP headquarter based country. The situation has led in the past to carrying of significant amount of cash in the cars and crossing the countries. The situation may lead to theft of funds or misappropriation of the funds	S	The WAPP's team should use the World Bank mechanism to transfer funds from one country to another country. Today, the World Banks are offering many solutions for the transfer of cash (transfer, etc.)	N	M
Overall inherent risk	S			S
Control Risk	**S**			**S**
Planning and Budgeting Delays in budget preparation process of the RESPITE and lack of appropriate budget monitoring system or coordination.	S	WAPP team should be working in coordination to ensure that the team has a global overview of the budget execution.	N	M
Accounting: Risk of delay in the record of the transactions in the accounting system	S	The WAPP could recruit additional project accountant if necessary to strengthen the	N	M

Risk	Risk Rating	Risk Mitigating Measures Incorporated into Project Design	Conditions for Effectiveness (Y/N)	Residual Risk
Inherent risk				
regarding as there is only one project accountant. This situation can impact the accuracy and comprehensiveness of the financial data so the quality of financial reports.		accounting team.		
Internal Control: Limited internal control issues. The external audit management letter raised some minor internal control weaknesses. For example, lack of systematical monthly bank reconciliation	S	The project accountant should prepare a monthly bank reconciliation. These Bank reconciliations should be approved by the Director of finance	N	M
Funds Flow: Risk of theft or misappropriation of the project's funds due to the carrying of cash in hand to make payment through the countries. Risk of misused of funds and use funds to pay non- eligible purposes or combined with other projects funds managed by the WAPP Secretariat.	S	The WAPP's team should use the World Bank mechanism to transfer funds from one country to another country. Today, the commercial Banks are offering many solutions for the transfer of cash (credit card, rapid transfer, etc.) Organize frequent controls in each involved actor in order to help to prevent and mitigate the risk of diversion of funds.	N	M
Financial Reporting Delay in the preparation of the IFRs. The WAPP used to submit the IFRs on time. Unfortunately, we noted delay in the submission of the latest IFRs and this delay was caused by the loss of the data of the programmatic part of the report.	S	To avoid any delay at the programmatic level, focal point should be designated for the PPA activities and get inducted on the timely production of IFRs.	N	M
External Auditing: WAPP used to submit the external audit reports on time with acceptable capacities	M	The PPA funds audit may be combined with the subsequent project first year audit. This will give enough time to the WAPP team to recruit the auditor	N	M
Governance and Accountability Possibility of circumventing the internal control system with colluding practices as bribes, and abuse of administrative positions are potential risks. mis-procurement etc., is a critical issue.	M	The ToR of the external auditor will comprise a specific chapter on corruption auditing. To enhance transparency and accountability, the project's budget and audited financial statements will be disclosed on WAPP website each year.	N	M

Risk	Risk Rating	Risk Mitigating Measures Incorporated into Project Design	Conditions for Effectiveness (Y/N)	Residual Risk
Inherent risk				
		With respect to dealing with fraud and anticorruption, the World Bank Anti-Corruption Guidelines referred to in the FA will apply.		
OVERALL FM RISK	**S**			**M**

ANNEX 2: Procurement

1. **Procedures.** Procurement under the proposed project will be carried out in accordance with the World Bank "Procurement Regulations for Investment Project Financing Borrowers" dated November 2020, the "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants" dated October 15, 2006 and revised in January 2011 and as of July 1, 2016, and beneficiary disclosure requirements, as well as other provisions stipulated in the project Legal Agreements.

2. **Emergency and Project Procurement Strategy for Development (PPSD).** The project has triggered Paragraph 12, Section III of the IPF Policy concerning preparation of projects under emergency situation which allows for deferring the preparation of the PPSD, however as part of the preparation of the emergency project, the Recipients/Borrowers have prepared a PPSD while further details will be added and finalized during project implementation. The PPSD describes how procurement activities will support project operations for the achievement of project development objectives and deliver Value for Money. The procurement strategy is linked to the project implementation approaches ensuring proper sequencing of the activities together with E&S requirements. A procurement plan has also been prepared and will be updated during implementation. Special arrangements such as simplified procurement processes in accordance with World Bank's Procurement Regulations, direct contracting, the use of Statements of Expenditure, UN Agencies, local NGOs, Hands-on expanded implementation support (HEIS), force account, and results-based arrangements may be used and are described in the PPSD. The PPSD also includes a summary on procurement risks, a mitigation action plan, and a procurement implementation support and supervision plan (see below).

3. **Hands-on expanded implementation support (HEIS).** The World Bank has provided HEIS to the project to facilitate the PD that will be established in the RCU to conduct centralized procurement activities on behalf of the four participating countries through preparation of BDs , issuance of BDs, opening and evaluation of bids, and recommendation of award for the Design, Supply, and Installation of Solar Plants. They will also extend support to the PIUs in participating countries in the preparation of RFPs and Evaluation of Proposals for the selection of Supervision Engineers.

4. **Systematic Tracking of Exchanges in Procurement (STEP).** The project will use the World Bank's STEP, an online planning and tracking system that will provide data on procurement activities, establish benchmarks, monitor delays and measure procurement performance. Use of STEP is mandatory for all procurement transactions subject to post and prior review under the project.

5. **Procurement Staffing Capacity.** Implementing agencies in all participating countries have international procurement consultant and national procurement officers who are managing existing World Bank-financed energy projects and will be handling procurements for this project at national level. For regional level procurements the activities will be done by the central regional project implementing agency that will be established in Liberia and will recruit a PoE to work with the team in procurement and contract management.

6. **Procurement Planning**. A draft Procurement Plan, to be updated during implementation, outlines the procurement procedures to be used to plan and monitor implementation of investment activities. Major procurement packages as identified in the PPSD will be managed at the RESPITE Coordinating Unit. The

Procurement Plan for the project details the activities to be carried out during the first 18 months, and was submitted prior to negotiations.

7. **Advance Contracting and Retroactive Financing**. The project design has provided a window for the Borrowers to carry out advance contracting and retroactive financing in accordance with Section V (Paragraphs 5.1 and 5.2) of the World Bank Procurement Regulations for IPF Borrowers of November 2020. The retroactive financing will be allowed up to 40 percent of the credit covering the expenditures incurred by the project with effect from the date mentioned in the FA. Retroactive financing was agreed with the Republic of Liberia and Togolese Republic and is reflected in the respective FAs[42].

8. **Standard Procurement Documents (SPD)**: The project shall use the World Bank's latest SPD versions for the procurement of Consulting Services, Non-Consulting Services, and Goods.

9. **Procurement Post Reviews and Independent Post Reviews by the World Bank**. Based on the assessed agency implementation risk for procurement, which is **Substantial** Risk, the World Bank will carry out Procurement Post Reviews or Independent Post Reviews for all contracts based on the approved procurement plan not subject of prior review by the World Bank. An assessment of client's capacity has been conducted and summarized as follows:

10. **Clients' Capability to Implement the Project:** Liberia is a fragile country and Sierra Leone is a post conflict country that was removed from a list of fragile countries in 2018 but still has fragility characteristics and capacity constraints. The agencies in both countries have implemented energy projects and have significant experience and capacity to implement this project.

11. **Liberia**: LEC has implemented energy projects including Liberia Electricity System Enhancement Project (LESEP, P120660) and Liberia Accelerated Electricity Expansion Project (LACEEP, P133445). It is also implementing the ongoing Liberia Electricity Sector Strengthening and Access Project (LESSAP, P173416). Some key staff that implemented the closed LESEP and the ongoing LACEEP projects, are familiar with the World Bank procurement procedures. Among the qualified professionals is the International Procurement Specialist, who is still in the service of LEC. LEC will play key roles during the project implementation. Since RCU is being located in Liberia, the Implementing Agency may require additional qualified professionals.

12. **Sierra Leone**: Sierra Leone EDSA has a PIU that have implemented Bank funded projects including Sierra Leone Energy Sector Utility Reform Project (P120304), Sierra Leone Energy Access Project (P126180) and Enhancing Sierra Leone Energy Access (P171059). The PIU has an international procurement consultant and a procurement officer working with other international technical experts.

13. **Chad**: SNE has a PIU that is implementing Bank funded projects (Cameroon-Chad Power Interconnection Project [P168185]and Chad Energy Access Scale Up Project [P174495]). The PIU has an experienced Procurement Specialist, a Procurement Management Consultant (PMC) to support them in day-to-day

[42] Liberia: For payments made prior to the Signature Date, except that withdrawals up to an aggregate amount not to exceed US$600,000 and US$400,000 may be made for payments made prior to this date but on or after November 25, 2022, for Eligible Expenditures under Category 3 and 4, respectively; Togo: For payments made prior to the Signature Date, except that withdrawals up to an aggregate amount not to exceed EUR 1,000,000 and EUR 1,000,000 may be made for payments made prior to this date but on or after May 1, 2022, for Eligible Expenditures under Category 1 and 4, respectively.

work and a supervision engineer. They will be handling procurements for this project at national level.

14. **Togo**: AT2ER, which will be the PIU for Togo component, does not have implementation experience implementing World Bank-financed projects. However, it has implemented similar projects funded by others donor like AfDB, European Union, Islamic Development Bank. The PIU has an acceptable qualified procurement officer working with experienced technical experts. The AT2ER will work in close collaboration with CEET, the Togolese utility that has prior experience with World Bank-financed projects.

15. **WAPP**: Procurement activities under Component 4A will be implemented by the WAPP. This sub-component is to continue and extend the activities currently being implemented under - Côte d'Ivoire, Sierra Leone, Liberia, and Guinea Power System Re-development Project (P113266). For this reason, institutional and implementing arrangements will be the same as those this project. Hence, it will fall under the responsibility of a team with well-established experience and satisfactory results under the above-mentioned project. The same team is also implementing a World Bank-financed project named Solar Development in Sub-Saharan Africa - phase 1 – (P162580). Under this last project, this team has acquired a good knowledge and experience concerning procurement in the solar field (services and goods)

16. **Procurement Risk.** The overall procurement risks associated with the project in all beneficiary countries is **Substantial**; this rating is due to: (i) inefficiencies and delays in procurement process; (ii) insufficient competition in procurement; (iii) weak complaint redress system; and (iv) collusion and interference in contracting process). The procurement risk under component 4A differs from the other parts of the project. WAPP procurement risk and performance have been regularly monitored and assessed through the World Bank support to the implementation of the components of the projects under WAPP responsibility. Over the last five years, the procurement assessment has evolved from substantial to low.

17. Country specific procurement risks and mitigation measures are in tables below:

Table A2.1. Project Procurement Risk Factors and Action Plan for Liberia

Risk/Issue	Action	Responsibility	Timeline
Inadequate understanding of the World Bank Procurement Regulations for IPF Borrowers.	Procurement staff and PIU staff will receive continuous training on the World Bank Procurement Regulations for IPF Borrowers. The International Procurement Specialist will also provide constant support to PIU to ensure adherence to the Procurement Regulations.	World Bank	Effectiveness
Inadequate contract management capacity.	Hire a qualified and experienced contract management specialist with energy/engineering background, specialized in managing construction contracts.	PIU	Immediately
Poor quality technical specifications and TOR and poorly defined evaluation criteria	Robust technical specifications, ToRs and appropriate evaluation criteria will be issued along with BDs. They will be cross-checked by technical experts prior to issuance.	PIU	Continuous
Use of unqualified and inexperience evaluation members.	Only sector specialists and those with appropriate technical expertise will serve on evaluation committees.	PIU	Continuous
Changes to Specification	All changes will follow the procedures provided		Continuous

Risk/Issue	Action	Responsibility	Timeline
and requirement during contract implementation	in signed contracts and will be cleared with the World Bank.		
Acceptance/ Certification of deliverable by non-technical experts	Only qualified technical experts, especially in the user department, will certify the acceptable deliverables in terms of quality and quantity and associated invoices.	PIU	Continuous.

Table A2.2. Project Procurement Risk Factors and Action Plan for Sierra Leone

Risk/Issue	Action	Responsibility	Timeline
Inefficiencies and delays in procurement process.	Strengthen capacity on the use of STEP tools, to manage all procurement transactions and related documentation.	World Bank	Immediately
Low competition and Fraud and corruption risks [including collusion and outside interference] in contracting process	Finalize PIM to include procurement procedures and implementation arrangements for the project along with the standard and sample documents to be used.	PIU	Two months after effectiveness
Incomplete record keeping	Train the PIU on keeping procurement records and contract management systems to ensure efficient and effective contract management.	Recipient	Three months after effectiveness and continuous monitoring
Weak capacity in contract management at PIU	Hire Supervision engineer at PIU	PIU	Immediately

Table A2.3. Project Procurement Risk Factors and Action Plan for Chad

Risk/Issue	Action	Responsibility	Timeline
Staff involved in the Project may not have enough knowledge of the National Procurement Framework and/or risk of confusion with the former guidelines.	*Organize workshop sessions on the National Procurement Framework to train all staff involved in the procurement of the Project and Train all the new members of the SNE tender committee as well as staff at Ministry of Hydrocarbons and Energy (*Ministère des Hydrocarbures et de l'Energie*, MHE) and Ministry of Economic Prospective and International Partnerships (*Ministère de la Prospective Economique et des Partenariats Internationaux,* MPEPI)	SNE/PIU	Within 2 months of effectiveness
Delays in (i) bidding process due to delay in preparation of technical inputs; (ii) approval of bid evaluation reports; and (iii) contracts execution.	*Put in place (i) mechanisms to anticipate the preparation of technical inputs in BDs; and (ii) contract management plans for major contracts and critical contracts at MHE and MPEPI	SNE/PIU	Within two months after effectiveness
Inadequate communication and interaction between the beneficiaries	*Improve communication through regular meetings		Within six months after effectiveness

Risk/Issue	Action	Responsibility	Timeline
and the PIU, which may lead to delays in procurement processes and poor estimation of the costs	*Engage subject matter technical specialists in the entire procurement cycle of procurement activities.	SNE/PIU	
Procurement in a specialized market in a fragile area with few bidders can restrict competition and possibly increase prices and collusion risks	*Organize procurement red flags training in collaboration with Integrity Vice Presidency (Preventive) for the PIU.	SNE/PIU /World Bank	Within three months after effectiveness
Poor contract management and administration of big contracts	*Develop contract management plans for prior review. Keep large value works on team's radar for regular follow-ups with support from technical and ESF team members, as may be needed for review.	SNE/PIU /World Bank	Within two months after effectiveness
Poor filing which can lead to loss of documents	*Put in place a filing system at the PIU to ensure compliance with World Bank procurement filing manual.	PIU	Throughout project implementation

Table A2.4. Project Procurement Risk Factors and Action Plan for Togo

Risk/Issue	Action	Responsibility	Timeline
Delays in procurement process no Objection and approval by the procurement commissions and other internal entities	Set up a procurement monitoring tools and ensure that the procurement commissions comply with procurement service standard times for contract no objection approval time	PIU	Within three months after project effectiveness
Inappropriate existing Administrative, Accounting and Financial Manual of procedures	Develop a manual of procedures by updating the current Administrative, Accounting, Financial and procurement Manual of procedures (as part of the PIM) of the PRISET project (P160377), that will also include detailed procedures describing the procurement	PIU	Within three months after project effectiveness
Staff of the PIU in charge of procurement may not be qualified	Assigned the current procurement specialist of PRISET to the PIU or recruit another qualified procurement specialist	PIU	Within three months after effectiveness

WAPP

18. As already stated, WAPP procurement performance for components of the World Bank-financed projects under their responsibility of WAPP is satisfactory. WAPP procurement team is composed of seasoned procurement specialists with well-established results working within well-functioning institutional arrangements.

Procurement Approaches

19. Procurement will take place at the RCU level and the national PIU level. A PPSD and the procurement plan covering the first 18 months of the project implementation were prepared. The detailed PPSD should be elaborated within thirty days of Project Effectiveness. Any updates of the Procurement plan shall be submitted for World Bank approval. The Recipients shall use the World Bank's online procurement planning and tracking tools (STEP) to prepare, clear and update its Procurement Plans and conduct all procurement transactions.

ANNEX 3: Economic and Financial Analysis

1. This annex presents the economic and financial analysis of the RESPITE. The analysis uses a cost-benefit framework to determine the development impact of the project and provides a rationale for public financing as the appropriate vehicle for its delivery. It also presents the value-added of World Bank's support and how it maximizes the development impact of staff efforts.

2. The analysis finds that that the project is beneficial irrespective as to whether it displaces thermal generation or meets latent demand for grid electricity, which has recently increased with thermal generation often becoming unaffordable. Specifically, under the scenario whereby the project displaces existing and/or future thermal generation that could otherwise be developed, the baseline NPV of the project is estimated at US$335 million and ERR at 16 percent. Furthermore, when considering the impact of the project on reduction of CO_2 emissions, the net benefits increase to between US$568 million and US$801 million, depending on the assumptions around the social cost of carbon. Under Scenario 2, whereby the project is meeting latent demand for grid electricity, the baseline NPV of the Project is estimated at US$557 million and ERR at 21 percent. Furthermore, when considering the impact of the project on reduction of CO_2 emissions, the net benefits increase to between US$876 million and US$1,196 million under the second scenario.

Rationale for Public Financing and value added of World Bank Support:

3. RESPITE is an emergency project, making public financing necessary. The project's rationale is to directly respond to current energy sector issues in the four countries whose economics have become worse due to the current situation on global energy markets. Private-sector interest, which has historically been low for investing in electricity generation projects in Sub Saharan Africa, is limited in view of the weak financial viability of utilities in those countries and the unreliable infrastructure. The risks associated with such investments and the lack of appropriate business models to mitigate against such risks make these investments unattractive for private investment. In RESPITE countries these challenges are particularly profound given the underdeveloped financial sector, the weak financial position of the respective utilities, the inadequate infrastructure, the high poverty levels and the underdeveloped institutional structures. The emergency project, RESPITE, will support existing World Bank interventions to help improve utility finances and improving grid reliability to ensure that it is ready for future renewable integration. With no solar capacity under operation in three of the four countries the project investments demonstrate the benefits of a new technology while helping to lay the enabling framework for the private sector to get involved.

4. The World Bank's value-added comes from its extensive global experience and expertise in electricity generation and access projects, as well as its ability to streamline and scale procurement across multiple countries. It also brings a sizeable envelope of lower-cost concessionary financing. The World Bank also has the benefit of years of extensive and productive dialogue with the governments and relevant sector agencies involved in RESPITE, which places it in a unique position to design and implement an effective regional project. With the indefinite engagement with all four governments, the World Bank is also able to develop a longer-term outlook and corresponding Program that ensures a committed partnership with the governments as they pursue power sector development and a path towards universal electricity access.

Project's Economic Analysis

5. **An economic analysis was carried out to assess the development impact of the project in terms of expected benefits and costs over the lifetime of the assets funded by the project** (assumed to be 25 years for Solar PV and 40 years for distribution and 50 years for run-of-river MCHPP extension). The economic analysis is consistent with the new World Bank guidelines on economic analysis and relies on a standard cost-benefit framework which compares the present value of incurred costs to the stream of attributable benefits under two scenarios, i.e., the "with project" and "without project" scenario.[43] The main decision-making criteria of the economic viability of the project are the EIRR and NPV, with the project deemed economically viable if the EIRR is greater than the discount rate and the NPV is positive. To present all costs and benefits at a common point in time, the economic analysis relies on a real social discount rate of 6 percent.

6. **The overall net benefit of the project depends on the share of the newly added renewable generation that will displace existing thermal generation, and the share of the newly added renewable generation that will meet latent demand for grid electricity** (i.e., load that the power system is unable to serve with current grid-connected generation capacity either because there is insufficient generation capacity or the cost of thermal generation became unaffordable to the countries resulting in increased amounts of load shedding and increased amount of unserved demand), with these shares summing to one. With rising cost of thermal generation, the utilities and the governments have been finding it even more difficult to meet demand and pay for even more expensive thermal generation. For example, in Sierra Leone, the actual generation observed between January and June 2022 was more than 20 percent lower than the contractual generation from Karpower resulting in significant amounts of load shedding. The situation is not different for Chad, where petroleum in the primary source of public revenue, since due to the very poor financial situation of the utility where SNE currently recovers only about 50 percent of its costs and is highly dependent on subsidies, one of the three IPPs recently left the country as SNE was not able to meet their payment obligations, leading to an increase in unserved demand in Chad.

7. **The project is beneficial irrespective as to whether it displaces thermal generation or meets latent demand for grid electricity with the latter increasing as a direct result of high fuel prices.** The economic analysis does not take an assumption as to what share of renewable generation is assumed to serve demand that would not be met through grid-connected generation without the project versus demand that would be met with fossil fuels without the project. Instead, the analysis is undertaken for both of these possible counterfactuals and is hence robust to the storyline, showing that the project is beneficial irrespective as to whether it displaces thermal generation or meets latent demand for grid electricity. In practice, the project's actual impact is likely to be somewhere between these two extreme scenarios (i.e., the project fully displacing thermal generation considered under Scenario 1, and the project fully meeting latent for grid electricity considered under Scenario 2).

8. **Benefits:** For Scenario 1: for the PV and HPPs, benefits are calculated from the fuel savings achieved by

[43] The economic analysis is consistent with the following guidelines: (i) World Bank IPF Policy and Directive; (ii) Power Sector Policy and Investment Projects: Guidelines for Economic Analysis; and (iii) Discounting Costs and Benefits in Economic Analysis of World Bank Projects 2016.

displacing the thermal generation for the duration of the economic lifetime of the generation assets developed by the project. In Chad, Togo, and Sierra Leone the project also supports the development of BESS, which in turn have the potential to reduce system costs by reducing curtailment of intermittent renewable generation and some thermal generation capacity, as batteries can contribute towards meeting peak electricity demand. In view of this, a capacity credit is assigned reflecting the likelihood of the Solar PV + BESS to be available to meet peak demand and hence avoid some thermal generation capacity that is also counted as a benefit. For distribution, benefit of grid connection for households is estimated through their WTP for grid electricity and through avoided diesel self-generation for non-residential connections. For Scenario 2: the economic benefits are calculated by the project meeting latent demand for grid electricity where the incremental benefits of consumption are valued at WTP for electricity for residential customers and avoided fuel costs using diesel self-generators for non-residential customers.

9. **Costs:** The economic costs considered for the project comprise of the total expected Design, Supply and Installation cost for the Solar PV, hydro generation and BESS, costs of connection of the newly built power stations to the grid and other project development costs, cost of O&M over the lifetime of the project assets, as well as other costs such as battery replacement costs, costs associated with project management and supervision and costs of resettlement.[44] The key decision-making criteria of the economic viability of the project are the EIRR and the NPV with the project deemed economically viable if the EIRR is greater than the discount rate and the NPV is positive. To present all costs and benefits at a common point in time, the economic analysis relies on a real social discount rate of 6 percent.

10. **The project is also expected to bring some benefits from reduced GHG emissions.** In addition to the quantifiable benefits, the economic analysis also considers the additional benefit derived from reduced GHG emissions. The impact of the project on GHG emissions is calculated as the difference between the emissions associated with the level of service proposed by the project compared to the emissions associated with current alternatives under "without project" scenario. The analysis is undertaken in accordance with the World Bank Greenhouse Gas Accounting Methodology for Energy Access Investment Operations and NREL's most recent estimates of Life Cycle Greenhouse Gas Emissions from Electricity Generation. The reduction in GHG emissions is expected as the Project will shift the generation mix for the grid towards a higher renewable share compared to the current situation with the investments being in line with results of a least-cost generation and expansion modelling undertaken for the countries in the past.

11. **The economic analysis shows that the project is economically viable under both of the considered scenarios, even without any consideration of environmental externalities.** Under Scenario 1, whereby the

[44] Whenever possible, the economic and financial analysis relies on estimated costs as per available feasibility studies of the various generation projects. For countries where feasibility studies have not yet been finalized or such data was not available, the analysis relied on estimated investment costs of 800 US$/kWp for Solar PV DSI costs and 350 US$/kWh for BESS DSI costs; and estimated O&M costs of 15 US$/kWp/year for Solar PV and 10 US$/kWh/year for BESS. Costs are likely to vary by project size and country and it is difficult to draw firm conclusions on what costs can be achieved on the ground before the competitive tender of the DSI contractor is finalized and the actual operation of the power plants (for O&M costs). We note, however, that there would need to be a considerable increase in costs before the project's estimated ERR would hit the hurdle rate of 6 percent (i.e., assumed social cost of capital). For example, the total costs for Chad would need to increase by over 40 percent to bring the ERR from the current estimate of 16 percent to 6 percent without making any considerations for GHG benefits.

project displaces existing and/or future thermal generation that could otherwise be developed, the baseline NPV of the project is estimated at US$335 million and ERR at 16 percent. Furthermore, when considering the impact of the project on reduction of CO_2 emissions, the net benefits increase to between US$568 million and US$801 million, depending on the assumptions around the social cost of carbon. Under Scenario 2, whereby the project is meeting latent demand for grid electricity, the baseline NPV of the project is estimated at US$557 million and ERR at 21 percent. Furthermore, when considering the impact of the project on reduction of CO_2 emissions, the net benefits increase to between US$876 million and US$1,196 million under the second scenario.

12. A summary of the project economic analysis is provided below and further detail of the analysis for each country including an analysis of the project's impact on each of the national utility is provided in the remainder of this section, with all monetary values presented in NPV terms (US$2022). The relatively higher net benefit of the Project under Scenario 2 is intuitive, as (i) increased reliance on diesel self-generation has higher associated costs compared to grid-based thermal generation and WTP for electricity tends to be higher than avoided fuel costs of grid-connected thermal generation; and (ii) using inefficient alternatives to electricity as well as small diesel generators is more polluting compared to grid-based thermal generation. In practice, the project's actual impact is likely to be somewhere between these two extreme scenarios (i.e., the project fully displacing thermal generation and the project fully meeting latent for grid electricity).

Table A3.2: Summary of Project economic analysis by country and net impact on GHG emissions

Scenario 1. Benefits estimated assuming the project displaces thermal generation

Country	NPV (US$2022 million)			EIRR (%)			Net impact on GHG emissions ($MtCO_2e$)*
	Without GHG Benefits	With GHG Benefits (Low)	With GHG Benefits (High)	Without GHG Benefits	With GHG Benefits (Low)	With GHG Benefits (High)	
Liberia	175	304	432	18%	24%	30%	-6.3
Togo	38	61	83	14%	18%	22%	-0.8
Sierra Leone	76	123	170	16%	21%	26%	-1.5
Chad	46	81	116	16%	22%	27%	-1.1
Project (aggregate result)	**335**	**568**	**801**	**16%**	**22%**	**27%**	**-9.6**

Scenario 2. Benefits estimated assuming the project meets latent demand on the grid

Country	NPV (US$2022 million)			EIRR (%)			Net impact on GHG emissions ($MtCO_2e$)*
	Without GHG Benefits	With GHG Benefits (Low)	With GHG Benefits (High)	Without GHG Benefits	With GHG Benefits (Low)	With GHG Benefits (High)	
Liberia	292	462	632	19%	32%	38%	-8.3
Togo	62	92	122	17%	22%	26%	-1.0

Sierra Leone	122	194	266	22%	29%	36%	-2.2
Chad	80	128	176	19%	26%	32%	-1.5
Project (aggregate result)	**557**	**876**	**1,196**	**21%**	**28%**	**34%**	**-13.0**

Table A3.3. GHG assumptions

Life-cycle emission factors by type of generation technology (Component 1 and 2)		
Solar PV	43 gCO_2e/kWh	*Life Cycle Greenhouse Gas Emissions from Electricity Generation: Update, NREL 22610*
BESS	35.4 gCO_2e/kWh	*Ibid.*
Hydropower	21 gCO_2e/kWh	*Ibid.*
Natural gas	486 gCO_2e/kWh	*Ibid.*
Oil (grid-connected)	840 gCO_2e/kWh	*Ibid.*
Diesel self-generation	1,200 gCO_2e/kWh	*Power Sector Investment Projects: Guidelines for Economic Analysis, Technical Notes, 8 May 2017*
Alternatives to electricity (households)	1,300 gCO_2e/kWh	*Guidance GHG Accounting for Energy Access Investment, May 2017.*
Assumed emission factors for grid extension (Component 3)		
Tier 3 baseline emissions (for the without the Project scenario)	800 gCO_2e/kWh	*Guidance GHG Accounting for Energy Access Investment, May 2017.*
WAPP grid emission factor (for the with the Project scenario)	559 gCO_2e/kWh	

Note: The median estimate of the total life-cycle emission for lithium-ion battery is 33 gCO2e/kWh, while the analysis relied on a sum of the median value of the one-time upstream (32 gCO2e/kWh) and one-time downstream emissions (3.4 gCO2e/kWh) to err on the conservative side when evaluating the impact on the Project on GHG emission reduction.

13. **The project is also expected to reduce the need for subsidies to the national power utilities that would otherwise be required in the four countries.** The project is expected to lower the need for subsidies paid by the governments of the four countries. Under Scenario 1, whereby the project is assumed to be fully displacing the current and/or future thermal generation that could have otherwise been built, the impact on subsidies is estimated as the difference between the incremental costs to the country as a result of the project and avoided costs of thermal generation. Under Scenario 2, whereby the project meets latent or incremental demand, the impact on the need for subsidies to the national utility is calculated as the difference between the incremental costs to the country as a result of the project and the incremental tariff revenues of additional power supplied. Under both of the scenarios, the project is shown to reduce the need for subsidies across all the four countries.

14. The incremental levelized cost of generation was also calculated “with” and “without” the project. Under Scenario 1, without the project, the average cost of generation was calculated based on fuel costs that the government has to pay for thermal energy supply to the grid, while with the project, the costs are calculated for generation of PV and Hydro over the lifetime of the asset. Meanwhile, under Scenario 2, without the project, the average cost of generation was calculated based on the non-residential

consumers' use of diesel self-generators, while with the project, the costs are calculated by Hydro and/or PV generation over the lifetime of the asset. The table below demonstrates the reduction in cost of generation when relying on thermal energy vs the generation cost of installing the project's Hydro and PV plants over the lifetime of the assets.

Table A3.4: Summary of the project impact on subsidies and incremental levelized generation costs by country

Scenario 1. Benefits estimated assuming the project displaces thermal generation[45]

Country	Average avoided annual subsidy for the first five years of the project lifetime (% of annual GDP)	Incremental levelized generation costs (US¢2022/kWh)		
		Without the project (incremental costs of grid-based thermal generation)	With the project - total cost of incremental generation supplied by the Project	With the project - cost of incremental generation supplied by the project incurred by the country
Liberia	0.39	13.9	6.0	6.0
Togo	0.06	17.1	10.8	10.8
Sierra Leone	0.29	18.2	10.1	2.0
Chad	0.08	18.5	12.0	3.6
Total Project		**15.4**	**7.8**	**5.6**

[45] Under Scenario 1, whereby the project is displacing thermal generation, when calculating the incremental costs of grid based generation, only economic costs for which there is a reasonable expectation that these can be avoided as a result of the project are considered. This means for Liberia we consider only forward-looking fuel costs over the lifetime of the assets developed by the project as avoidable with no avoided capacity costs of thermal generation due to the variability of both Solar PV and hydro generation. On the other hand, for Sierra Leone, Chad and Togo, where the project is expected to add some 28 MWh, 60 MWh and 40 MWh of energy storage capacity, respectively, we also consider some thermal generation capacity could be avoided (for the purposes of the analysis we considered that to be between 7-10MW of thermal generation capacity in each of the countries).The resulting unit incremental costs of grid-based generation that is the benefit of the project under Scenario 1 is therefore lower for Liberia, compared to Sierra Leone, Chad, and Togo. In addition, in Chad the thermal generation being displaced is diesel, and hence the economic costs of thermal generation are relatively higher compared to Sierra Leone where HFO is being displaced (Sierra Leone on the other hand incurs higher fuel transportation costs and hence the resulting difference is relatively small). The lower unit incremental costs of grid-based generation for Togo are also driven by the fact that the Togolese generation mix relies considerably on gas-fired power generation where forward-looking fuel costs are relatively lower compared to oil-fired generation. For Liberia, on the other hand, the economic lifetime of the hydro assets developed by the project is assumed to be 50 years, in line with the feasibility study, which drives down the incremental levelized costs of alternatives under the 'Without Project' scenario. Fuel prices considered in the analysis are based on the latest available Commodity Markets Outlook from October 2022 (i.e., based on expected fuel prices of 100 US$/bbl of Brent crude oil in 2022, 92 US$/bbl in 2023 and 80 US$/bbl in 2024). As the forecast in the Commodity Market Outlook does not go beyond the year 2024, for the purposes of the analysis and to err on the conservative side we assumed fuel prices would reduce further in line with earlier forecasts and assumed prices will reduce to 70 US$/bbl of crude oil by 2030 and stay constant thereafter.

Scenario 2. Benefits estimated assuming the project meets latent demand on the grid[46]

Country	Average avoided annual subsidy for the first five years of the project lifetime (% of annual GDP)	Incremental levelized generation costs (US¢2022/kWh)		
		Without the Project *(cost of alternatives to electricity and WTP for electricity)*	With the Project - total cost of incremental generation supplied by the Project	With the Project - cost of incremental generation supplied by the Project incurred by the country
Liberia	0.39	22.5	6.0	6.0
Togo	0.08	22.7	10.8	10.8
Sierra Leone	0.19	22.7	10.1	2.0
Chad	0.04	26.0	12.0	3.6
Total Project		**23.0**	**7.8**	**5.6**

Project's Financial Analysis from the point of view of national utilities

15. **In addition to the economic analysis, a financial analysis assessing the cash flow impact of the proposed project on each of the national utilities was undertaken.** The financial analysis was undertaken from the point of view of each of the national utilities in Liberia, Togo, Chad, and Sierra Leone using a discounted cash flow approach assessing expected incremental revenues and incremental costs to the utility as a result of the Project. As with the economic analysis, the financial analysis is confined to the project activities that generate quantifiable benefits for which a financial value can be clearly identified and measured. As at the time of the project preparation it was not clear whether any of the IDA credits provided as part of the project could be on-lent to the national utilities (only for Liberia and Togo, as for Chad and Sierra Leone the full envelope is a grant), thus, to err on the conservative side, a scenario under which the loan is on-lent by the governments to the utility was also considered when evaluating the impact of the project on each of the utilities.

Table A3.5. General Assumptions for IDA credit for Togo and Liberia

50-Year Credit	• 50-year tenor • 0% coupon rate • 10-year grace period • 2.5% principal repayment for years 11-50

16. **The project is expected to bring positive cash flows to the national utilities across all of the four countries, thus considerably improving the financial situation of the utilities and reducing the need for subsidies from the state budget and/or the need for tariff increases.** Table A3.6 summarizes the results of the project financial analysis from the perspective of each national utility.

Table A3.6. Summary of project financial analysis
Scenario 1: Benefits estimated assuming the project displaces thermal generation

US$2022	Debt service and debt repayment (if any) stays with the Government		Scenario under which the concessional loan (if any) is on-lent to the national utility	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Country	**FNPV ($m)**	**FNPV ($m)**	**FNPV ($m)**	**FNPV ($m)**
Liberia (LEC)	206	174	198	165
Togo (CEET)	96	79	86	69
Sierra Leone (EDSA)	112	76	112	76
Chad (SNE)	83	40	83	40
Total	**497**	**369**	**479**	**350**

Note: The financial discount rate assumed is 10 percent real, unless otherwise specified. For Togo, the financial discount rate assumed is 6.7 percent as per the latest CEET financial model. When estimating revenues from electricity sales and cash collected, assumptions around the overall T&D losses and collection rates had to be taken. Specifically, overall T&D losses are based on the most recent data available and as provided by the respective utilities. Unless specific information on the level of technical losses was provided by the respective utilities, a normative value for technical losses of 10 percent of sent-out generation with the rest being commercial losses is assumed. Non-collections are also based on the most recent data from the utilities. The analysis starts with actual performance and improvements in losses and collection rates are considered if there was a reasonable basis to do so (e.g., if there is a revenue protection program in place).

ANNEX 4: Technical Assistance Activities Implemented by West African Power Pool

1. Sub-Component 4A: Regional Integration and Technical Assistance (RITA) to WAPP covers four groups of activities, which will be implemented by the general secretariat of the WAPP.

Table A4.1. Budget of activities

Activity	Amount ($US k)
Finalization and operationalization of the legal, regulatory and technical frameworks to enable efficient regional trade between WAPP countries	1,000
Technical integration of the WAPP network by improving the synchronous operation and reliability of interconnectors	5,400
Preparation of priority regional projects as per the WAPP Master Plan 2018, including: • St. Paul River 2 HPP in Liberia, solar PV in Liberia being developed under Sub-Component 1A, Mount Coffee HPP extension in Liberia being developed under Component 2 • Ghana-Burkina-Mali (GBM) interconnection • Median interconnection.	11,000
Strengthening of the institutional and technical capacity of the WAPP Secretariat to undertake its regional mandate	1,800
Contingency for delays, cost overruns and exchange rate fluctuations	800
Total	**20,000**

I. Finalization and operationalization of the legal, regulatory and technical frameworks to enable efficient regional trade between WAPP countries

2. This activity is to provide commercial, technical, legal and transaction support to (i) agree on PPAs between buyers and sellers for regional trade in the WAPP region; (ii) agree on TSAs to use transmission interconnectors to buy and sell power for regional trade; and (iii) provide capacity building through hands on training workshops on how to prepare and negotiate PPAs and TSAs, based on the model PPA and TSA and accompanying guide developed by ECOWAS Regional Electricity Regulatory Authority (ERERA) and WAPP.

3. More specifically, this activity entailed advisory services and capacity building workshops by experts that helped the WAPP countries in better preparing and negotiating commercial agreements, according to the commercial frameworks developed by ERERA and the WAPP. The experts develop a guide for the use of model PPAs and transmission service agreements. These experts also gave training workshops to the country teams (ministries, and utilities) in charge of preparing and negotiating those commercial agreements. The beneficiaries included CEB countries (Benin and Togo), CLSG, North Core, OMVG countries[47], Ghana and Mali, as well as WAPP and ERERA staff.

4. What remains now to be done is to provide some advisory services for CLSG and North Core, and support to the WAPP Secretariat. The exact scope may vary according to demand from the

[47] Senegal, Guinea, Guinea-Bissau and The Gambia

countries but about 85 to 95 percent of the activity has been completed.

II. Technical integration of the WAPP network by improving the synchronous operation and reliability of interconnectors

5. This activity is the synchronization of the WAPP transmission system consisting of:
   (a) testing and tuning of remaining power station control systems (power system stabilizer tuning, governor testing, and change of settings);
   (b) support to conduct tests of the synchronization of the three different zones of the WAPP transmission network;
   (c) post synchronization study to fine tune the dynamic data of the WAPP network model according to outputs of the synchronization trials;
   (d) training of transmission system operators on synchronization tests;
   (e) support for WAPP's owner engineer during the guarantee period for equipment previously installed at high voltage substations;
   (f) replacement of telecommunication equipment in high voltage substations;
   (g) assistance for static var compensator (SVC) O&M; and
   (h) TA to the synchronization working group and taskforce including support for meetings.

III. Preparation of priority regional projects as per the WAPP Master Plan 2018

6. This activity covers preparation of several priority generation and transmission projects listed as critical ones in the WAPP Master Plan, 2018. This included support for preparation of the North Core Regional Transmission Interconnector, preliminary preparatory studies for the Souapiti hydro generation plan in Guinea, and today, the focus is on three projects in Liberia and two regional interconnector projects: (i) St. Paul River 2 HPP, solar PV in Liberia being developed under Sub-Component 1A, MCHPP extension in Liberia being developed under Component 2; (ii) GBM interconnection; and (iii) Median interconnection.

Projects of Liberia

7. This activity covers feasibility studies, E&S studies and strategic advisors to bring the projects of Liberia to readiness for implementation.

8. The feasibility studies will facilitate mobilization of financial resources for the projects, and will follow technical best practices including, as relevant, design criteria, civil engineering and hydraulic studies, electromechanical and hydromechanical studies, electrotechnical studies (including transformers and substations), design of the Supervisory Control and Data Acquisition (SCADA), control systems, ancillary equipment, geological baseline report, geotechnical investigations, etc.

9. The E&S studies will include evaluation of the design of the project, and development, as relevant, of the ESIA, ESMP, RAP, labor influx and work camp management plans, etc.

10. The strategic advisor will provide strategic and financial advice for the development of the project. This will include an assessment of different financing options, facilitation of identification of optimal and bankable financial structuring, and the option of preparing bidding documentation.

Ghana-Burkina-Mali (GBM) interconnection

11. The GBM interconnection project shall indicatively result in the construction of approximately 566 km of 330kV double circuit transmission line of which 149 km will be in Ghana, 362 km in Burkina, and 55 km in Mali, extension or construction of a substation in Ghana, Burkina, and Mali, installation of SCADA and communication systems, electrification of communities along the line route, installation of equipment for frequency and voltage regulation, reinforcement of national transmission networks, and installation of protection and control equipment.

12. This activity's objective is to prepare pre-investment studies that includes (i) an updated line alignment; (ii) an updated ESIA, environmental impact statement, RAP, and ESMP; (iii) an updated feasibility study; and (iv) and bidding documentation. Note that these studies are currently in the process of being prepared but will be revised and updated to bring them in line with the ESF. They are jointly funded by the French Development Agency (*Agence Française de Développement*, AFD), AfDB, and the World Bank.

Median interconnection

13. The Median interconnection project shall indicatively result in the construction of approximately 1,600 km of high voltage double circuit transmission line, extension or construction of substations in Nigeria, Benin, Togo, Ghana, Côte d'Ivoire, installation of SCADA and fiber optic systems, electrification of eligible communities/villages along the line route, installation of compensation and synchronization equipment if required, and reinforcements of the networks of the involved WAPP member utilities – TCN (Nigeria), CEB (Togo-Benin), GRIDCo (Ghana), and CI-ENERGIES (Cote d'Ivoire), if necessary.

14. The activity's objective is to prepare pre-investment studies that include (i) a line route and ESIA study (including RAP, ESMP, etc.); (ii) a feasibility study; and (iii) bidding documentation. These studies are currently in the process of being prepared but will be revised and updated to bring them in line with the ESF. The World Bank is the only donor involved.

IV. Strengthening of the institutional and technical capacity of the WAPP Secretariat to undertake its regional mandate

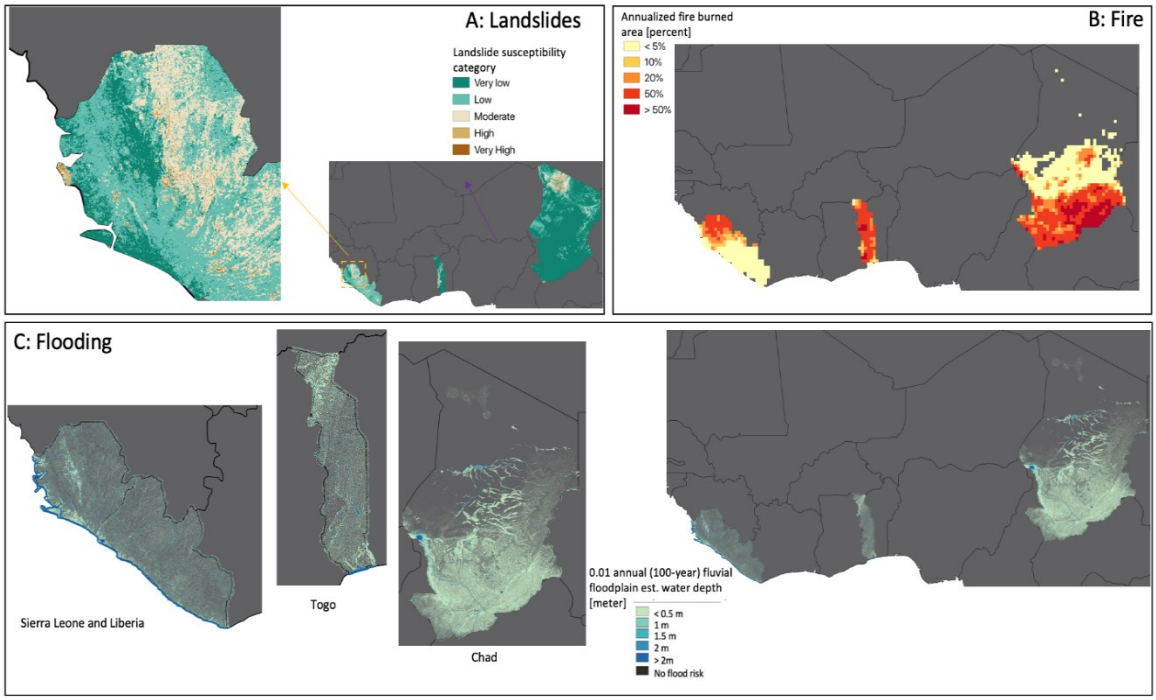
15. This activity will support WAPP to organize meetings as part of governance of the CLSG interconnector and other regional meetings, including logistical expenditures. It will also support capacity building and institutional strengthening of the WAPP (including socioenvironmental specialist(s)), and support financing of the team that will support implementation of the Liberian parts of this sub-component.

ANNEX 5: Climate and Hazard Considerations

Climate Change and Natural Hazard Risks and Adaptation Opportunities

1. Resilient infrastructure development in the countries of Liberia, Sierra Leone, Togo, and Chad includes consideration of existing natural hazards and ongoing climate change. Relevant risks for this project include wildfire (high risk), landslide activity (high risk), flooding (high risk), and droughts (medium risk)[48]. Extreme Heat is also assessed as a high risk for these locations. Figure A5.1 details historical risks. Figure A5.2 shows the expected increases in extreme heat due to ongoing climate change, focused on the 2030 and 2040 decades, as well as droughts. Multiple strategies can be taken to mitigate the impacts of climate change and natural hazards. These fall generally into the categories of resistance and resilience to hazards. Resistance strategies are ones that reduce the likelihood that a hazard will damage infrastructure (e.g., increasing seismic tolerance to earthquakes). Resilience, by contrast, is an adaptive property of a system that allows it to maintain service delivery even when some of its components are damaged[49].

Figure A5.1. Key hazard risks in the project region

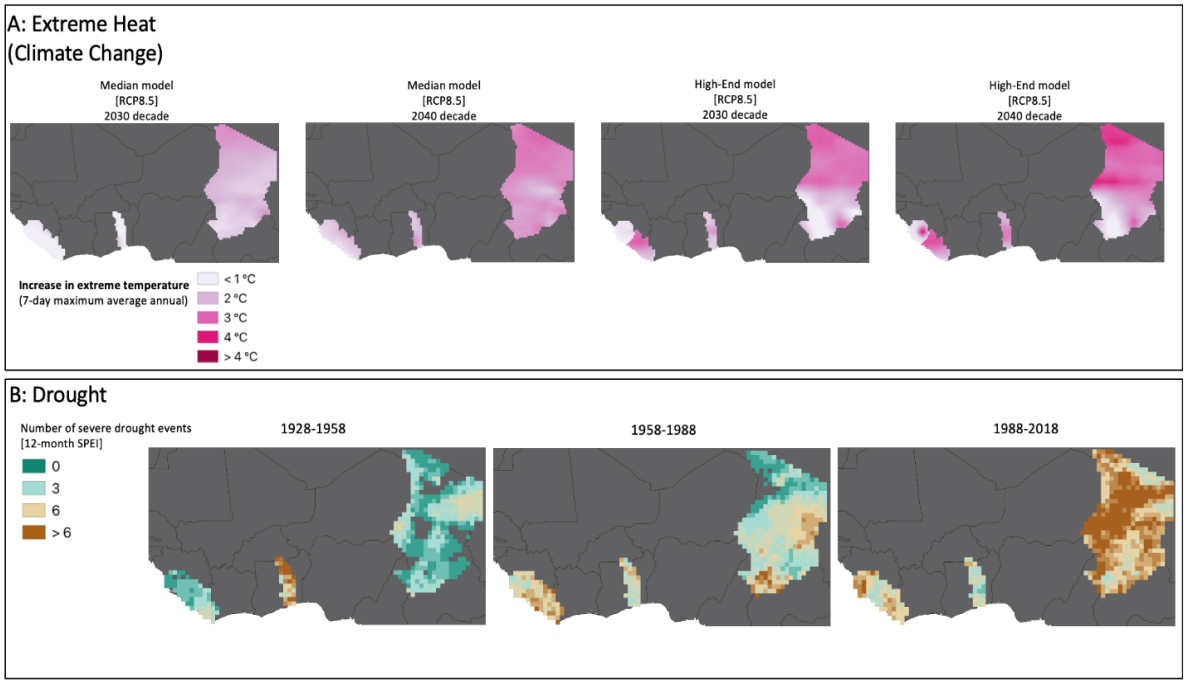


A: Landslides susceptibility, obtained from data on slopes, geology, faults, forest loss, etc.[50]. (30 arcsecond grid, approximately 1km x 1km). B: Wildfire Risk, calculated as the annualized fire impact in each region, based on 15-year historical average [51]. Value is total percent of land area (0.25° grid, approximately 25 km x 25 km) burned each year

[48] ThinkHazard database. The World Bank (2021). https://www.thinkhazard.org
[49] Schweikert, AE, GF L'Her, MR Deinert (2021): Simple method for identifying interdependencies in service delivery in critical infrastructure networks, Applied Network Science, 6, 44, 2021, https://doi.org/10.1007/s41109-021-00385-4
[50] T. Stanley and D. B. Kirschbaum, "A heuristic approach to global landslide susceptibility mapping," Natural hazards, vol. 87, p. 145–164, 2017
[51] Giglio, L., Randerson, J., & Van der Werf, G. (2013). Analysis of daily, monthly, and annual burned area using the

based upon all available data for 1997-2015. C: Flooding Risk, shown as the estimated depth of water from the 0.01 annual probability historical flood event ("100-year event") for fluvial (river) and pluvial flooding. Zoomed in region shows a closer look around the project location.

Figure A5.2. Climate hazard considerations in the project region.



A: Extreme heat increases from climate change through the 2030 and 2040 decades, shown for the median (50th percentile) and high-end (95th percentile) climate models. Values are the average annual increase, in degrees Celsius, of the hottest week of the year[52]. B: Droughts events, based on the Global 12-month SPEI database[53]. Three historical 30-year periods are shown.

2. Wildfire is recognized as a 'high' risk in the considered countries under current climate conditions[1], and climate change is expected to exacerbate this[54]. However, this risk varies geographically (Figure A5.1.A). These data are calculated based upon an annualized average from an historical 25-year period[4]. Increasing the resistance of energy assets to wildfires can prevent disruptions and repair costs. Using light-duty steel poles in place of wooden poles for transmission systems would decrease the risk of damage by wildfires provided that vegetation is kept away from the transmission lines. Yearly maintenance to manage vegetation to reduce fire risk would add to this cost. If substations must be located within high fire risk areas, vegetation setback from the substation is an effective strategy to reduce risk. Fire presents the same risk to generation stations

fourth‐generation global fire emissions database (GFED4). Journal of Geophysical Research: Biogeosciences, 118(1), 317–328

[52] Decadal values represent the average of the annual 7-day maximum average temperature for each year within the corresponding decade. The 2030 decade represents the average value for the years 2030-2039, for example. Values are the increase, in degrees Celsius, above the 30-year historical baseline (calculated as the average of annual 7-day maximum temperatures from 1970-1999). Calculations completed by the authors, based on data from NASA Center for Climate Simulation, NASA NEX-GDDP (2019)

[53] Global SPEI database, https://spei.csic.es/database.html

[54] Liu, Y., Stanturf, J. A., & Goodrick, S. L. (2009). Trends in global wildfire potential in a changing climate. Forest Ecology and Management 259:685-697, 259(2010), 685–697. https://doi.org/10.1016/j.foreco.2009.09.002

than it would to structures of similar construction. Vegetation management, and siting in low-risk regions are primary mitigation strategies.

3. Flooding is considered as 'high' risk for the considered countries, although the risk varies geographically. Available information for the depth of water under an expected 0.01-annual flood probability ("100-year flood")[55] is shown in Figure A5.1.C. This means that there is a 1 percent chance in any given year of a flood occurring at the depths shown. In a 30-year project timeframe, this amounts to a 26 percent likelihood of occurring at least once. It should be noted that the data presented in Figure A5.1 is based on historical occurrences, which is limited both by the available historical record. Increasing the resistance of energy assets to flooding hazards can prevent getting assets that are stranded and alleviate the costs of disruptions. Flood can affect T&D poles either through liquefaction or scour[56]. The easiest and most effective method to limit flood impacts is to site these systems in location with low flood hazard. Baring this, deep anchor or beams around transmission poles and towers can reduce flood damage. Elevation of substations is a common approach to decreasing the risk of flood damage. Floods can also weaken the foundations to which solar PV systems are anchored, as well as affect the electrical components if they are submerged. Siting solar farms in locations with low flood risk is typically the best strategy to reduce risk while also elevating the electrical components above expected inundation levels.

4. The risk for 'extreme heat' in current climate conditions is similarly rated as 'high' in the considered countries[1], although climate change is expected to increase median and extreme temperatures by more than 2 degrees Celsius by the 2040 decade[5]. Extreme heat has impacts on energy demand (cooling for buildings), T&D efficiency, transformer life, and potential increases to other hazards already a concern in the region, including wildfire risk. For T&D infrastructure operating at full capacity, increases in ambient temperature reduce the efficiency of transmission. Figure A5.2.A shows the increased annual seven-day maximum average temperature for each decade, relative to the historical values. Values are presented in degrees Celsius for the 2030 and 2040 decades for the median (50th percentile) and higher-end (95th percentile) climate models. In most locations, the increase in maximum temperatures over a seven-day average across each decade is approximately 2°C in the median model for the 2040 decade, while the higher end model shows an increase of 3.5°C.

5. The efficiency of transmission lines decreases with elevated ambient temperatures as does the maximum load the lines can transmit[57]. The relationship between transmission efficiency and temperature is linear, however ambient temperature is not the only component affecting this; solar irradiance and wind speed matter as well. As a point of comparison, estimates put the reduction in average transmission line capacity in the US between 1.9 percent-5.8 percent by mid-century[58] and reductions would be higher in locations with higher temperatures. Transmission line sag also increases with the temperature of the conductor[59], which will itself increase with ambient

[55] FATHOM Flooding Data [Fluvial, Pluvial]. WBG (2021)
[56] Miyamoto, 2019, https://documents1.worldbank.org/curated/en/620731560526509220/pdf/Technical-Annex.pdf
[57] Bartos, M, et al.: Impacts of rising air temperatures on electric transmission ampacity and peak electricity load in the United States, Environmental Research Letters, 11, 114008, 2016
[58] Matthew Bartos et al 2016 Environ. Res. Lett. 11 114008 *https://iopscience.iop.org/article/10.1088/1748-9326/11/11/114008/ampdf*
[59] Yan Du and Y. Liao, "Online estimation of power transmission line parameters, temperature and sag," 2011 North American Power Symposium, 2011, pp. 1-6, doi: 10.1109/NAPS.2011.6024854

air temperature[60]. Increased sag can increase the likelihood of the lines contact vegetation if vegetation is not managed. Transmission efficiency losses require additional generation to compensate, and lines should be rated to compensate for reductions in their capacity. Transformers are expected to experience a reduction in operating life due to climatic shifts as well as efficiency losses[61]. Lifetime reductions and efficiency losses increase with ambient temperature. Decreases in transformer life require an increased replacement schedule and decreases in efficiency require corresponding increases in generation. The efficiency of solar PV systems goes down with increasing cell temperature typically at 0.2 percent per ^{o}C[62]. However, the cell temperature itself depends on multiple factors including solar irradiance, ambient temperature and air movement. Decreases in PV output can be compensated for by increasing the size of installed capacity, which is linear in cost.

Resilience of and Through the Project

6. The resilience *of* the RESPITE Project will be increased by appropriate siting and design of project generation facilities. The resilience *through* the project will be affected by multiple project outcomes. The project will help increase electricity access across all four countries, which is essential for economic growth. This will be done by installing 106 MW of grid connected solar and 41 MW of hydro that will help increase supply of clean electricity to the grid and make power supply more reliable, while reducing the fiscal impact of the sector in project countries. In Sierra Leone the project will help achieve its aspirations of becoming a middle-income country by 2039. RESPITE will support Liberia's economic productivity by reducing energy cost and increasing installed generation while reducing GHG emissions by 64 percent by 2030. In Chad, RESPITE will add 30 MW of solar and help set a benchmark for the government to acquire solar generation through competitive procurement. This will help the country achieve the goals of its 2017-2021 NDP which noted the importance of electricity in economic development. RESPITE plans to install 20 MW of solar in Togo as well as the needed T&D infrastructure for this power to be supplied to the end users. This will help Togo meet its 2018-2022 NDP goals, which identified the importance of reliable electricity in agriculture, manufacturing and extractives.

[60] R. Yao, K. Sun, F. Liu and S. Mei, "Efficient Simulation of Temperature Evolution of Overhead Transmission Lines Based on Analytical Solution and NWP," in IEEE Transactions on Power Delivery, vol. 33, no. 4, pp. 1576-1588, Aug. 2018, doi: 10.1109/TPWRD.2017.2751563

[61] Stahlhut, JW, GT Heidi, NJ Selover: A Preliminary Assessment of the Impact of Ambient Temperature Rise on Distribution Transformer Loss of Life, IEEE Transactions on power delivery, 23, 4, 2000-2007, 2008

[62] Chander, S A Purohit, A Sharma, Arvind, SP Nehra, MS Dhaka, A study on photovoltaic parameters of mono-crystalline silicon solar cell with cell temperature, Energy Reports, 1,104-109, 2015