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IDA/R2018-0179/2

June 21, 2018

**Closing Date: Friday, July 6, 2018
at 6:00 p.m.**

FROM: Vice President and Corporate Secretary

Western Africa - Solar Development in Sub-Saharan Africa Project - Phase 1

Extension of Closing Date

Due to the closure of WBG Washington DC offices on July 2 and 3, 2018, the closing date for the proposed grant to Western Africa for a Solar Development in Sub-Saharan Africa Project, that was distributed for consideration on an absence -of-objection basis with a closing date of July 3, 2018, is being extended to **Friday, July 6, 2018**.

Distribution:

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IDA/R2018-0179/1

June 14, 2018

**Closing Date: Tuesday, July 3, 2018
at 6:00 p.m.**

FROM: Vice President and Corporate Secretary

Western Africa - Solar Development in Sub-Saharan Africa Project - Phase 1

Project Appraisal Document

Attached is the Project Appraisal Document regarding a proposed grant to the West African Power Pool for a Western Africa - Solar Development in Sub-Saharan Africa Project - Phase 1 (IDA/R2018-0179), which is being processed on an absence-of-objection basis.

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Report No: PAD2810

INTERNATIONAL DEVELOPMENT ASSOCIATION
PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED GRANT
IN THE AMOUNT OF SDR 14.7 MILLION
(US\$21 MILLION EQUIVALENT)
TO THE
WEST AFRICAN POWER POOL (WAPP)
FOR THE
SOLAR DEVELOPMENT IN SUB-SAHARAN AFRICA PROJECT - PHASE 1 (SAHEL)

May 31, 2018

Energy and Extractives Global Practice
Africa Region

This document is being made publicly available prior to Board presentation. This does not imply a presumed outcome. This document may be updated following Board consideration and the updated document will be made publicly available in accordance with the Bank's policy on Access to information.



CURRENCY EQUIVALENTS

(Exchange Rate Effective April 30, 2018)

Currency Unit = SDR

US\$1 = SDR 0.69538128

FISCAL YEAR

January 1 - December 31

ABBREVIATIONS AND ACRONYMS

ACBP	Africa Climate Business Plan
AFD	French Development Agency (<i>Agence Française de Développement</i>)
AfDB	Africa Development Bank
APL	Adaptable Program Loan
CIF	Climate Investment Funds
CIGRE	International Council on Large Electric Systems (<i>Conseil International des Grands Réseaux Electriques</i>)
CLSG	Côte d'Ivoire, Liberia, Sierra Leone, Guinea
CSP	Concentrated Solar Power
DA	Designated Account
DFIL	Disbursement and Financial Information Letter
DPF	Development Policy Financing
ECOWAS	Economic Community of West African States
ECOWAS ECREEE	ECOWAS Centre for Renewable Energy and Energy Efficiency
ERERA	ECOWAS Regional Electricity Regulatory Authority
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
EU	European Union
FM	Financial Management
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GPN	General Procurement Notice
HFO	Heavy Fuel Oil
ICC	Information and Coordination Center
IFC	International Finance Corporation
IFR	Interim Financial Report
IMF	International Monetary Fund



IPP	Independent Power Producer
IRENA	International Renewable Energy Agency
KfW	German Government-owned development bank <i>Kreditanstalt für Wiederaufbau</i>
M&E	Monitoring and Evaluation
MIGA	Multilateral Investment Guarantee Agency
MFD	Maximizing Finance for Development
OMVG	Gambia River Basin Organisation (<i>Organisation pour la Mise en Valeur du Fleuve Gambie</i>)
OMVS	The Senegal River Basin Development Organization (<i>Organisation pour la Mise en Valeur du Fleuve Sénégal</i>)
PDO	Project Development Objective
PPA	Power Purchase Agreement
PPP	Public-Private Partnership
PPSD	Project Procurement Strategy for Development
PV	Photovoltaic
RAP	Resettlement Action Plan
SDG	Sustainable Development Goal
SOP	Series of Projects
SORT	Systematic Operations Risk-Rating Tool
SPN	Specific Procurement Notice
STEP	Systematic Tracking of Exchanges in Procurement
UNDB	United Nations Development Business
UNDP	United Nations Development Programme
VfM	Value for Money
VRE	Variable Renewable Energy
WAPP	West African Power Pool
WBCIP	World Bank-CIGRE Partnership

Regional Vice President: Makhtar Diop

Country Director: Rachid Benmessaoud

Senior Global Practice Director: Riccardo Puliti

Practice Manager: Charles Joseph Cormier

Task Team Leader(s): Pierre Audinet, Alexis Lucien Emmanuel Madelain,
Franklin Koffi S.W. Gbedey

**BASIC INFORMATION**

Country(ies)	Project Name	
Western Africa	Solar Development in Sub-Saharan Africa - Phase 1 (Sahel)	
Project ID	Financing Instrument	Environmental Assessment Category
P162580	Investment Project Financing	A-Full Assessment

Financing & Implementation Modalities

☐ Multiphase Programmatic Approach (MPA)	☐ Contingent Emergency Response Component (CERC)
☒ Series of Projects (SOP)	☐ Fragile State(s)
☐ Disbursement-linked Indicators (DLIs)	☐ 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)	

Expected Approval Date	Expected Closing Date
21-Jun-2018	31-Oct-2023
Bank/IFC Collaboration	Joint Level
Yes	Complementary or Interdependent project requiring active coordination

Proposed Development Objective(s)

The Series of Projects' development objective (PDO) is to promote the deployment of competitively-procured Regional Solar Parks in West Africa and enable the dispatch of variable solar energy.

SOP #1 project specific PDO is to strengthen the regional technical capacity for preparation of large-scale solar parks and integration of solar electricity into the grids

**Components**

Component Name	Cost (US\$, millions)
Regional Solar Integration, Dispatch and Capacity Building.	8.00
Regional Solar Parks Preparation.	13.00

Organizations

Borrower: West African Power Pool (WAPP)

Implementing Agency: West African Power Pool (WAPP)

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

Total Project Cost	21.00
Total Financing	21.00
of which IBRD/IDA	21.00
Financing Gap	0.00

DETAILS**World Bank Group Financing**

International Development Association (IDA)	21.00
IDA Grant	21.00

IDA Resources (in US\$, Millions)

	Credit Amount	Grant Amount	Total Amount
Western Africa			
Regional	0.00	21.00	21.00
Total	0.00	21.00	21.00

Expected Disbursements (in US\$, Millions)



WB Fiscal Year	2018	2019	2020	2021	2022	2023	2024
Annual	0.00	0.50	2.00	6.00	7.00	5.50	0.00
Cumulative	0.00	0.50	2.50	8.50	15.50	21.00	21.00

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

Gender Tag

Does the project plan to undertake any of the following?

a. Analysis to identify Project-relevant gaps between males and females, especially in light of country gaps identified through SCD and CPF	Yes
b. Specific action(s) to address the gender gaps identified in (a) and/or to improve women or men's empowerment	Yes
c. Include Indicators in results framework to monitor outcomes from actions identified in (b)	Yes

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	● Moderate
2. Macroeconomic	● Low
3. Sector Strategies and Policies	● Moderate
4. Technical Design of Project or Program	● Moderate
5. Institutional Capacity for Implementation and Sustainability	● Moderate
6. Fiduciary	● Moderate
7. Environment and Social	● Low



8. Stakeholders	● Substantial
9. Other	● Substantial
10. Overall	● Moderate

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

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	✓	
Performance Standards for Private Sector Activities OP/BP 4.03		✓
Natural Habitats OP/BP 4.04	✓	
Forests OP/BP 4.36		✓
Pest Management OP 4.09		✓
Physical Cultural Resources OP/BP 4.11	✓	
Indigenous Peoples OP/BP 4.10		✓
Involuntary Resettlement OP/BP 4.12	✓	
Safety of Dams OP/BP 4.37	✓	
Projects on International Waterways OP/BP 7.50		✓
Projects in Disputed Areas OP/BP 7.60		✓

Legal Covenants

Sections and Description

the Recipient shall employ, under terms of reference and with qualifications and experience satisfactory to the Association: (i) not later than three (3) months after the Effective Date, one (1) procurement specialist and one (1) accountant; and (i) not later than four (4) months after the Effective Date, one (1) expert consultant in variable renewable energy. Schedule 2, Section I. A.1 of Financing Agreement.



Sections and Description

The Recipient shall establish and thereafter maintain throughout Project implementation, a team of safeguard experts within the WAPP Secretariat, under terms of reference and with qualifications and experience satisfactory to the Association, which shall include:

- (a) one (1) environmental specialist and one (1) social specialist to be employed by the Recipient not later than three (3) months after the Effective Date.
- (b) one (1) dam specialist, to be employed by the Recipient not later than six (6) months after the Effective Date; or
- (c) any other specialists as may have been agreed with the Association. Schedule 2, Section I. C.3 of Financing Agreement

Sections and Description

The Recipient shall take all action required: (i) to carry out the Project in accordance with the provisions and requirements set forth or referred to in the Project Implementation Manual; (ii) to submit recommendations to the Association for its consideration for changes and updates of the Project Implementation Manual as they may become necessary or advisable during Project implementation in order to achieve the objective of the Project; and (iii) not assign, amend, abrogate or waive the Project Implementation Manual or any of its provisions without the Association's prior agreement. Schedule 2, Section I. E of Financing Agreement

Sections and Description

The Recipient shall: (i) not later than three (3) months after the Effective Date: (A) update the WAPP Secretariat's existing accounting software version to make it suitable for the Project and reflect the Project specificities, thereby allowing the Recipient to comply with its obligations under this Agreement; and (B) revise the work-program of the WAPP Secretariat's internal audit unit to include the Project; and (ii) not later than six (6) months after the Effective Date, appoint an external auditor under terms of reference and with qualifications and experience satisfactory to the Association. Schedule 2, Section I, G of Financing Agreement

Sections and Description

The Recipient shall, not later than three (3) months after the Effective Date establish, and thereafter maintain and operate, a functional complaint handling mechanism for the Project, with adequate staffing and processes for registering complaints and acceptable to the Association, thereby ensuring the ongoing improvement on service delivery under the Project. Schedule 2, Section I, H of Financing Agreement

Sections and Description

The Recipient shall ensure that all technical assistance under the Project, the application of whose results would have environmental or social implications, shall only be undertaken pursuant to terms of reference reviewed and found satisfactory by the Association, such terms of reference to ensure that the technical assistance takes into consideration, and calls for application of, the Association's safeguard policies and the relevant Participating



Countries' own laws relating to the environment and social aspects. Schedule 2, Section I.C.1 of Financing Agreement

Conditions

Type Effectiveness	Description The Recipient shall have updated the Project Implementation Manual in form and substance satisfactory to the Association. Article V, 5.01 of Financing Agreement
Type Disbursement	Description No withdrawal shall be made for payments under Category (2)(b), until and unless Burkina Faso has submitted to the Association the duly signed Burkina Faso Letter of Agreement in form and substance satisfactory to the Association; Schedule 2, Section III. B.1 (b)
Type Disbursement	Description No withdrawal shall be made for payments under Category (2)(c), until and unless Mali has submitted to the Association the duly signed Mali Letter of Agreement in form and substance satisfactory to the Association. Schedule 2, Section III. B.1(c)



WESTERN AFRICA
SOLAR DEVELOPMENT IN SUB-SAHARAN AFRICA - PHASE 1 (SAHEL)

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I. STRATEGIC CONTEXT

A. Regional Context

1. Regional cooperation is critical to end extreme poverty and boost shared prosperity in the West Africa region and the Sahel (together the Broader West Africa Region or the Region)¹. This Region is diverse economically, culturally, and ecologically, presenting both opportunities and challenges for regional cooperation. Countries in the Region have moved politically and economically toward greater cooperation. The first effort of regional cooperation was in 1945 with the creation of a single currency union that brought together the francophone countries that are part of this Region. In 1975, 16 countries—Benin, Burkina Faso, Cabo Verde, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Sierra Leone, Senegal, and Togo—came together, through the Treaty of Lagos, to promote economic integration across the Region by forming the Economic Community of West African States (ECOWAS).² ECOWAS' mission is to promote economic cooperation and regional integration as a tool for accelerated development of the West African economy as presented in the ECOWAS Vision 2020.³ In 2014, Burkina Faso, Mali, Mauritania, Niger, and Chad created the G5 Sahel to coordinate policies and strategies for development and security.

2. In 2017, the Alliance for the Sahel was created to promote an integrated approach to address development and security challenges in the Sahel region. The Alliance for the Sahel was launched in 2017 by France, Germany, and the European Union, along with the World Bank, the United Nations Development Programme (UNDP), and the Africa Development Bank (AfDB). This international cooperation platform aims at pioneering an integrated approach to address development and security challenges in the Sahel region focusing on six priority sectors: youth employment, rural development and food security, energy and climate, governance, decentralization and access to basic services, and security. The Alliance seeks to promote greater collaboration and alignment of objectives among development partners to maximize the impact of resources and reduce duplication. It will also secure buy-in from the participating governments through a series of reforms and enhanced institutional capacity, required to accelerate access to sustainable energy in the shortest possible time. With regard to energy, the Alliance's objective is to double access rates within five years - an interim target toward achieving universal access by 2030.

3. Despite positive prospects, the overall growth in the Broader West Africa Region remains low, primarily due to its vulnerabilities to external shocks, economic interdependencies, and recent political instability. According to the International Monetary Fund (IMF), while the gross domestic product (GDP) increase has been significant in some countries in 2017, such as in Côte d'Ivoire (7.6 percent), Senegal (6.8 percent), and Burkina Faso (6.4 percent), it has been very low or even negative in other countries of the Region such as Nigeria, The Gambia, and Liberia. Difficulties in achieving steady sustainable growth in the Region have been primarily driven by dependencies to external global economic trends such as raw material prices, political instability, particularly in the Sahel, the aftermath of the Ebola crisis, climate

¹ The Broader West Africa Region encompasses 15 countries: Benin, Burkina Faso, Cabo Verde, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Sierra Leone, Senegal, and Togo.

² Mauritania formally withdrew from the Organization in 2002.

³ The ECOWAS Vision 2020 is a resolution adopted by ECOWAS in June 2007 to significantly raise the standard of living of the people in the Region through conscious and inclusive programs.



variability and change impacts, and recent economic downturn coupled with high inflation in Nigeria directly affecting neighboring economies. More than 70 percent of the population in the Sahel and West Africa Region lives on less than US\$3.10 per day, and more than 50 percent of the population lives below the poverty line with less than US\$1.90 per day.⁴ According to UNDP's Human Development Report, the Region has an average development index of 0.46 and most of those countries are in the category of countries with 'low human development'. Only Cabo Verde and Ghana are ranked in the category of countries with 'average human development'.

4. Climate change impacts aggravate the Broader West Africa Region's development challenges.

Although this Region is only responsible for a fraction of global energy-related greenhouse gas (GHG) emissions, it will be highly affected by climate change, which will exacerbate extreme weather conditions such as floods and droughts. According to the 2018 World Bank report 'Groundswell: Preparing for Internal Climate Migration', there will be around 90 million climate internal migrants in Sub-Saharan Africa by 2050, if no actions are taken to fight climate change. If left unchecked, climate change will affect the ability of those countries to achieve their Sustainable Development Goals (SDGs) and complicate the implementation of regional strategies aimed at fostering socioeconomic development. In the forthcoming decades, the Region will need to invest in adaptation measures. The Region is also investing in cleaner technologies, in particular solar energy, which will reduce dependency on expensive fossil fuels for power generation, decrease the Region's GHG emissions, reduce exposure to price shocks, increase the resilience of the power ecosystem, and take advantage of global advances in reducing the cost of emerging technologies aimed at decarbonizing the power sector.

5. Countries in the Region face significant challenges in closing opportunity and outcome gaps between women/girls and men/boys⁵ and the lack of access to electricity worsens the existing gender gaps. Gender disparities are a significant problem in the Region with regard to education, health, and malnutrition, among others. In addition to gaps in human endowments, women also face barriers in access to and control of productive assets such as land. Lack of land tenure security for women is an important impediment to poverty reduction and shared prosperity. Despite laws that provide women the right to own land, in practice, cultural norms prevent their ownership of land. Women have lower rates of labor force participation in most of the project countries and they often engage in less profitable income-generating activities, particularly in the agricultural sector. Lack of access to electricity services disproportionately affects women, in particular because of their reliance on electricity to fulfill household chores, which in many contexts is seen as primarily the responsibility of women.

B. Sectoral and Institutional Context

6. About half of the population in the Sahel and West Africa Region - more than 188 million people⁶ - do not have access to electricity with large disparities between rural and urban areas and between countries. The Broader West Africa Region has a 52 percent average access rate. Large disparities can be observed in the electrification rates within the Region itself, from 18 percent in Burkina

⁴ World Bank. 2016. *Poverty in a Rising Africa: Africa Poverty Report*.

⁵ Gender gaps identified are based on the following sources: IFC. 2007. *Gender and Economic Growth Assessment for Ghana*; McFerson. 2012. *Women and Post-Conflict Society in Sierra Leone*; World Bank. 2015. *Republic of Mali Systematic Country Diagnostics*; World Bank. 2015. *Côte d'Ivoire Systematic Country Diagnostics*; World Bank. 2017. *Burkina Faso Systematic Country Diagnostics*; World Bank. 2016. *Togo Systematic Country Diagnostics – Decision Draft*; World Bank. 2015. *Improving Gender Equality and Rural Livelihoods in Senegal*; and World Bank. 2002. *Benin Strategic Country Gender Assessment*.

⁶ World Bank. 2018. *Global Tracking SDG7: The Energy Progress Report*.



Faso to 71 percent in Cabo Verde. Significant disparities also exist between rural and urban populations, such as in Burkina Faso where 58 percent of the population in urban areas are connected, while only 3 percent in rural areas are. Out of the 188 million people that do not have access to electricity, two countries, Nigeria and Niger, host half. Lack of access to electricity means increased drudgery for women. Women and girls need to spend more time fulfilling household chores manually, and as a result, women and girls have less time for income-generating and educational activities. As the household is often the center of small-scale enterprises for women, the unavailability of electricity also negatively affects women's ability to generate income through such enterprises. The lack of electricity services can also lead to higher reliance on polluting and inefficient solid fuels for various tasks, including cooking or heating, which can negatively affect women and girls' health because they spend more time in proximity to such energy sources and face high risk of respiratory infections from exposure to household air pollution.⁷ As women and girls are often assigned the responsibility of collecting fuel, such as firewood and charcoal, they experience safety and health risks.

7. The energy services quality and the cost of power in the Broader West Africa Region hamper its social, economic, and industrial development. Countries face interrelated challenges of energy access, energy security, and high cost of electricity. Electricity shortages in urban areas and lack of access to modern, affordable, and reliable energy services in rural areas are interlinked with a variety of economic, social, environmental, and political problems. For those customers who have access to electricity, the ECOWAS region faces, on average, 80 hours of power cuts per day, and firms report losses in sales between 5 and 10 percent per month as a direct result of power cuts. In addition, electricity tariffs, for most countries in the region, are above US\$0.25 per kWh, which is more than twice the global average. This is attributed to the high dependence on fossil fuels, the inability to attract investments in power generation at scale (which will reduce costs), and inefficiencies along the value chain—such as high distribution losses, relatively low billing collection rates, and small isolated grid systems.

8. Countries in West Africa face strong growth in electricity demand, insufficient availability of public funds to invest in energy infrastructure to meet that demand, and in many countries, a limited track record in attracting private capital. In 2017, excluding Nigeria, the Broader West Africa Region's electricity generation total installed capacity was 18 GW. Power systems are often small, ranging from 15 MW installed electricity generation capacity for Guinea Bissau to slightly more than 1 GW in Côte d'Ivoire and Ghana to 4 GW in Nigeria. The Broader West Africa Region has an average yearly consumption per capita of 188 kWh, while Northern Africa and the South Africa Region have an average yearly consumption per capita of around 1,500 kWh and 2,000 kWh, respectively. A few countries in the Region such as Ghana, Nigeria, and Côte d'Ivoire have attracted private capital in power generation owing to the endowment of natural resources such as gas and hydropower which can be developed at scale, and relatively attractive business environments.

9. The West African Power Pool (WAPP) was created to support the regional integration of the different country grids and, with the support of the World Bank, WAPP is overseeing the construction

⁷ Clacy, Joy, Magi Matinga, Sheila Oparaocha, and Tanja Winther. 2012. "Social Influences on Gender Equity in Access to and Benefits from Energy." World Bank, Washington, DC; Ekouevi, Koffi and Voravate, Tuntivate. 2012. *Household Energy Access for Cooking and Heating: Lessons Learned and the Way Forward, A World Bank Study*. Washington, DC: World Bank. WHO. 2016. *Burning Opportunity: Clean Household Energy for Health, Sustainable Development, and Wellbeing of Women and Children*.



of regional high voltage transmission lines and the development of a regional electricity market.

Following the vision that energy resources available in the West Africa Region can be exploited for the mutual benefit of all countries, WAPP was created in 1999⁸. Covering 14 of the 15 countries of the regional economic community,⁹ WAPP's mandate is to oversee the regional integration of electricity grids to ensure technical adequacy of supply and demand, as well as to establish a regional electricity market. To do so, WAPP oversees all electricity transport and bilateral exchanges of electricity through regional interconnections in the electricity grid above 130 kV. WAPP has also a mandate on soft cross-cutting issues, notably on capacity-building activities relevant to all its members. The World Bank has developed a strong partnership with WAPP by supporting regional projects focusing mostly on high voltage interconnection transmission lines and capacity building. As presented further in Annex 4, the World Bank finances large transmission lines such as the Organization for the Development of the Gambia River (*Organisation pour la Mise en Valeur du Fleuve Gambie*, OMVG) (Guinea, Guinea Bissau, The Gambia, and Côte d'Ivoire), Côte d'Ivoire, Liberia, Sierra Leone, Guinea (CLSG), Organization for the Development of the Senegal River (*Organisation pour la Mise en Valeur du Fleuve Sénégal*, OMVS) (Kayes-Tambacounda), and is preparing the North-Core Transmission (Nigeria, Niger, Benin, and Burkina Faso) and the Guinea-Mali Interconnector which will be submitted to the World Bank's Board of Directors for consideration. The World Bank is also preparing the ECOWAS-Regional Electricity Access Project¹⁰, which seeks to develop the regional market for off-grid solar technology in West Africa and improve access to finance for private sector participation in that market.

10. WAPP has the mandate to identify and prepare regional power projects connected to the high voltage regional network and cross-border transmission lines. Since its creation, the WAPP Secretariat has taken a leading role in the development of regional integration infrastructure and implementation of priority projects identified in the ECOWAS Master Plan for the Generation and Transmission of Electrical Energy. The Master Plan, approved by the ECOWAS Heads of State, forms the basis for the development of regional projects. Once projects are in the Master Plan, WAPP has the full authority to deploy funds toward project preparation, including feasibility studies, environmental and social impact assessments (ESIAs), Resettlement Action Plans (RAPs), and related capacity-building activities. There is also an agreed upon mechanism between WAPP and the governments to involve the utilities and the line ministries at each step of the preparation of those regional investments. An update of the Master Plan has been launched early 2018 and will be concluded by the end of 2018. The 2012 Master Plan identified 36 priority regional projects, including two 150 MW Regional Solar Parks in Burkina Faso and Mali. Given the new price dynamics for solar photovoltaic (PV) and solar with storage, additional solar projects are expected to be identified in the 2018 Master Plan update.

11. WAPP also has the mandate to plan infrastructure-supporting regional integration of electricity markets, but has limited experience with variable renewable energy (VRE) electricity. By the early 2020s, WAPP will reach a significant milestone, as the primary interconnectors linking the 14 countries will be completed, which will enable electricity to flow from Nigeria to Senegal. This is expected to offer significant opportunities to trade electricity and develop projects at scale, which should result in the reduction of electricity prices by as much as half in some countries in West Africa. Overall, the World Bank

⁸ The WAPP was created by the Authority of ECOWAS Heads of State and Government through Decision A/DEC.5/12/99 and established in 2006 by the Authority of ECOWAS Heads of State and Government through Decision A/DEC.18/01/06.

⁹ Namely: Benin, Burkina Faso, Ghana, The Gambia, Guinea, Guinea Bissau, Ivory Coast, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo.

¹⁰ The World Bank projects in the pipeline are the North-Core Regional Interconnection Project P162933 (FY19), Guinea-Mali Interconnection P166042 (FY18) and the ECOWAS-Regional Electricity Access Project P164044 (FY19).



estimates that the regional power market could result in savings of US\$5 billion to US\$8 billion annually. The integration of the electricity grids in West Africa should enable these to absorb more VRE than they would if the national grids remained isolated, as it will enable countries to draw upon regional sources of power when solar technology is not available, for instance at night or during cloudy days (as the balance between supply and demand in electricity systems needs to be maintained at all times). However, as WAPP has very limited experience in the preparation of solar projects and integration of VRE, its capacity needs to be increased through a multifaceted technical assistance package. The WAPP Information and Coordination Center (ICC), currently under construction, will serve as the central monitoring and electricity trading accounting hub of the WAPP region. The center will enable effective monitoring of VRE electricity production and cross-border exchange. Therefore, it will improve the reliability of WAPP's future interconnected power system. Being able to effectively monitor VRE generation forecasts and production data across countries connected to the WAPP network will be key to supporting the operation of the entire interconnected system, in particular as the expansion of solar PV in the region's electricity systems starts to increase significantly.

12. The continuous decline in prices of solar electricity generation and battery storage is generating considerable interest in the Region as substantial investments in cheaper, cleaner, and reliable sources of electricity generation are needed. The Region's energy mix mostly comprises diesel, heavy fuel oil (HFO), and hydropower with some larger countries, such as Côte d'Ivoire, Ghana, and Nigeria having access to natural gas. Given the recent evolution in solar prices, whereby solar PV module prices dropped by more than 80 percent since 2009,¹¹ large-scale solar PV plants could become critical to reduce the Region's dependence on fossil fuels, while supporting a shift toward cleaner and less expensive sources of electricity. Most countries in the Region are reviewing their least-cost generation plan to include more solar generation in the energy mix, as the observed prices for solar PV obtained recently through competitive procurement of electricity generation, such as reverse auctions, in several developing countries are between US\$0.05–US\$0.10 per kWh.¹² Such power purchase agreement (PPA) prices have not yet been achieved in West Africa, with the exception of Senegal's Scaling Solar Initiative, due to issues including the lack of organized competition in procuring solar generation and the off-takers lack of creditworthiness. The decreasing cost of battery storage will also play a crucial role in supporting VRE integration by reducing the variability of the electricity production and shifting the production to the high demand hours of the day. Indeed, the cost of Li-ion battery storage fell by 70 percent between 2010 and 2016, and is expected to fall by an additional 50–60 percent by 2030.¹³ A World Bank financed ongoing study on 'Storage applications in the WAPP utilities and countries'¹⁴ will provide further details on key storage applications for the Region. The West Africa Region can also benefit from falling prices of solar with storage, which have seen a dramatic drop of 50 percent over the past 18 months. This is a rather new development which is yet to be integrated in least-cost generation plans.

13. With limited fiscal space, West African countries are increasingly shifting toward private sector participation to deploy grid-connected solar PV generation projects. The Region is endowed with high solar irradiation especially in the Sahel where Niger, Burkina Faso, and Mali have the highest irradiation of the Region with an average global tilted irradiation above 2,200 kWh per m² per year. To reduce their cost of generation and diversify their energy mix, most countries in the Region are planning the

¹¹ IRENA (International Renewable Energy Agency). 2018. *Renewable Power Generation Costs in 2017*.

¹² World Bank. 2017. *What Drives the Price of Solar Photovoltaic Electricity in Developing Countries?*, LiveWire 72.

¹³ IRENA (International Renewable Energy Agency). 2017. *Electricity Storage and Renewables: Costs and markets to 2030*.

¹⁴ The final version of the study is expected for FY19.



development of grid-connected solar generation. With large financing needs over the sector's entire value chain, the sector is increasingly relying on the private sector that has expressed strong interest in generation projects. Shifting from publicly financed projects to privately owned ones frees up scarce public and concessional resources for the access agenda and other fiscal priorities.

14. However, the prevalence of sole-source and unstructured competitive processes has impeded the timely delivery of cost-effective electricity supply by independent power producers (IPPs). Most IPPs in the Region have so far been negotiated bilaterally between the private sector and the utility. Such deals have led to protracted negotiations, are complex to integrate in the utility generation plan, and are usually quite risky for the IPP, which therefore increases the IPP's expected equity returns on investment and the PPA price. Transparent and fully structured auction schemes have proven to be delivering lower PPA prices in countries such as Zambia, Senegal, Argentina, and India compared to negotiated deals, feed-in-tariff, and unstructured competition. Organized standard reverse auctions provide a platform for IPPs to compete based on electricity tariffs with de-risking options set ex ante. The more recent solar park auction concept, implemented in India and Dubai, helps further reduce the development risk for IPPs by ensuring that land is secured, permits obtained, and power off-take and de-risking instruments are pre-arranged and made available before the auction (that is, an evacuation line exists or is under construction and the PPA contract, with the exception of the price, is ready). It thereby addresses upstream grid integration challenges as the park's location is strategically decided where there are no or less constraints on the grid.

15. The small installed capacity of solar PV in the Region reveals important regulatory, structural, and technical constraints such as inadequate IPP regulatory framework, limited planning and dispatch capacity, and overall grid integration challenges. At the end of 2017, the installed solar PV capacity in the Region (excluding Nigeria) was around 150 MW, representing 1 percent of the total installed electricity generation capacity. A handful of countries, namely Burkina Faso, Nigeria, and Senegal, possess most of the existing solar generation. The utility scale solar electricity generation projects are currently largely made of small PV plants of up to 30 MW, which are too small to benefit from economies of scale. The four key constraints preventing a sustained and more ambitious uptake of solar PV are the following:

- (a) **Grid integration challenges.** The Region is composed of small individual national power systems, very limited spinning reserve (excess generation capacity) and reactive power, outdated operation of networks, as well as the absence of automation in dispatch and adequate grid codes. Engineering and dispatching capacities are still very limited in the Broader West Africa Region and domestic experience with solar generation integration is modest in some countries and nonexistent in others. Therefore, the integration of VRE is challenging in the early stages, even at penetration levels of 5 percent to 10 percent, which are easily manageable in larger systems with automated dispatch. With the first solar PV plants coming online in several countries, utilities are increasingly realizing the technical and financial challenges that integrating larger volumes of VRE represents and fear that without additional investments in dispatch and system operation, solar generation will increase the risks of load shedding and systems' defaults.
- (b) **Weak planning capacity.** Least-cost generation plans are key for utilities to organize and contract the future generation that they will require in the medium to long term. However, most utilities in the Broader West Africa Region do not have the planning capacities that are required to develop such plans. Due to lack of planning, solar deployment in the Region has so far happened mainly through unsolicited bilateral proposals and it is unclear whether the



location and size of the solar plants are the optimum from a system's perspective. According to experience elsewhere, the development of solar parks in West Africa could help ensure minimal negative impact on the grid as the site of the park is selected based on the ability at the substation and of the grid to integrate the power and is part of the utility generation plan.

- (c) **Lack of IPP regulatory framework.** Few countries in the Region have experience with well-structured, competitively procured IPP-owned projects and have an adequate public-private partnership (PPP) regulatory framework. There is no visibility in the Region regarding the price advance of such procurement over negotiated deals, in particular during a technology disruption time where prices are still evolving. From the Government side, a well-structured competitive process can provide the data point required to demonstrate the advantages of such a process, not only with regard to price, but also with regard to site selection and overall fit to optimize energy resources. From the investor's perspective, a clear, consistent, and enforceable regulation is key to gain investors' confidence, reduce perceived risks, and ultimately increase expected equity returns.
- (d) **Limited financial viability of off-takers.** The distressed financial situation of electricity utilities in the Region arises from a mix of underpricing, weak sector regulation, inefficiencies along the value chain, and suboptimal energy mix. The utilities are not creditworthy and rely on budget transfers and/or on sovereign guarantees for critical investments in the sector. As a result, risk mitigation instruments will be critical to materialize private investments in Regional Solar Parks in a cost-effective manner.

Rationale for a Regional Series of Projects

16. The Solar Development in Sub-Saharan Africa Series of Projects (SOP) aims to support a harmonized and systematic regional approach to scaling up of cost-competitive large-scale solar generation by leveraging private capital. A harmonized regional approach is key to tackle the main challenges identified to the scale-up of solar energy in the West Africa Region: (a) technical grid integration challenges; (b) weak planning capacities; (c) lack of a proper solar generation procurement scheme; and (d) the poor financial viability of utilities/off-takers. The SOP will contribute to tackling country-specific regulatory constraints by providing, when/if relevant, inputs to existing Least-cost Development Plans, Master Plans in the power sector, existing Development Policy Financing (DPF), and by supporting a structured auction scheme developed under each subsequent project of the series. Such a systematic approach is needed to move from unsolicited bilateral deals to well-organized competitive tenders and from small-scale to large-scale solar projects, as well as to support a paradigm shift in the use of solar PV to a more 'dispatchable' generation with the support of battery storage or concentrated solar power (CSP).

17. A regional systematic approach to solar deployment leads to lower cost of electricity, improved VRE integration capacities, and increased solar contribution to the energy mix. Compared to World Bank Group Scaling Solar's country-level view, a regional approach (a) enables economies of scale with regard to project preparation; (b) supports the deployment of larger projects by enabling cross-border power trade; (c) supports least-cost increase in VRE penetration beyond individual country integration limits; (d) enhances synergies, regional learning, and knowledge sharing among countries and utilities; and (e) promotes regionwide technical and regulatory standards that are instrumental for deepened regional



integration. Furthermore, a regional approach provides a mechanism to share lessons on the various operations across countries, whether from the development and grid integration of solar projects already commissioned or in preparation such as in Burkina Faso (33 MW), Mali (33 MW), or Senegal (through the World Bank Group's Scaling Solar Initiative).

18. The regional capacity-building approach will draw heavily from the framework of and be complementary to the actions envisaged under the World Bank-International Council on Large Electric Systems (CIGRE) Partnership (WBCIP). The WBCIP seeks to improve the dissemination and application of state-of-the-art techniques to power systems development in Sub-Saharan Africa over the next four years. Building on each institution's strengths and networks, the WBCIP will focus on (a) helping African national utilities/institutions, regional institutions, electricity associations and power pools, such as WAPP, to implement and adopt internationally recognized best practices in the power industry; and (b) building the necessary technical expertise and human capacity to help develop technologically relevant, technically robust/resilient, economically, environmentally, and socially sound power systems to meet the electricity needs of people and economies. These capacity-building activities will contribute to closing the gender gap by ensuring the participation of women in those trainings as presented further in Annex 1.

19. The development of Regional Solar Parks aims to meet the countries' ambitions to (a) increase national electricity production necessary for energy security; (b) significantly reduce the average costs of electricity; and (c) provide countries with the opportunity to, over time, develop exports of solar electricity through regional interconnections. Given project scale and planned grid integration and prearranged de-risking instruments developed in partnership with IDA, International Finance Corporation (IFC), and Multilateral Investment Guarantee Agency (MIGA), solar park auctions are the recommended deployment scheme to reach cost-competitive solar PPA prices in the Region. Through this concept, public sector investment maximizes leverage on private capital, with the Government's public investment in off-site development being repaid through a yearly solar park fee paid by the auction winning IPP to the Government. The World Bank's Maximizing Finance for Development (MFD) principles are applied, as public and concessional financing will be considered only when essential, focused on preparing the site, reinforcing transmission and dispatching infrastructure to help with the VRE integration, and procuring solar generation capacity from private developers.

20. The proposed regional SOP approach will help expand mobilization of additional IDA funds through regional IDA to not only support capacity-building activities but also infrastructure investments while leveraging private capital for cost-competitive IPP-owned generation. By design, the SOP will focus on developing technical assistance activities through WAPP (in SOP #1) and investments benefiting multiple countries (in subsequent SOPs: SOP #2, SOP #3, and so on). While the private sector is expected to contribute the largest share of financing for solar generation investments, with the potential support of IFC and MIGA, public investments from sources such as IDA will be required to (a) reinforce the ability of the electricity grid to absorb VRE (dispatch and grid reinforcements); and (b) prepare well-structured solar auctions to attract private financing. The SOPs will be designed to benefit neighboring countries connected to the country of investment by the regional transmission lines. It is, therefore, expected that a significant share of regional IDA will be mobilized for each of the subsequent SOPs. Given the small size of the electricity systems in the Region and the distribution of primary energy resources, long-term modelling by the World Bank shows that the optimal plan for the Region is to deploy large-scale solar generation in the north of the Region where the resource is the highest and where the power deficit is the greatest (that is, Burkina Faso, Mali, Niger, and Senegal) and to use regional transmission lines to export the solar electricity to neighboring countries with lower solar irradiation. This approach brings



significant savings to the countries of the Region, in the form of reduced electricity supply costs (estimated cost savings of 11 percent annually) and avoided construction of new generation assets (estimated at 5 GW avoided by 2030) (see Annex 1).

21. A programmatic approach through an SOP is the most appropriate approach given the long-term vision for the interventions and multitude of clients. Therefore, it is appropriate to focus first on laying the groundwork for the enabling framework and identifying priority regional investment projects, and then facilitating these investments across the Broader West Africa Region, with particular focus on the Sahel. The SOP proposes to do so by identifying and supporting large additions of solar electricity generation, conceptualized as a package of investments in generation in the form of ‘dispatchable’ Regional Solar Parks. These identified investments in line with the Project Development Objectives (PDOs) can be supported by future SOPs, while including activities to systematically address bottlenecks such as reinforcement of dispatch systems, spinning reserves and reactive power requirements, expansion of regional interconnections (as well as coordination and joint dispatching), addition of storage, and, in the longer run, support to the development of a regional electricity market along with possibilities to trade ancillary services.

C. Higher Level Objectives to which the Project Contributes

22. The SOP supports the World Bank’s twin goals of poverty reduction and shared prosperity, while being consistent with the ECOWAS policy objectives on power generation and grid expansion and gender mainstreaming in utilities. Many of the West African countries Country Partnership Frameworks, such as the Republic of Mali (Report No. 94005-ML) and the Republic of Niger (Report No. 123736-NE), indicate energy as a priority area. Energy is also at the core of the regional economic integration. The ECOWAS Treaty specifies the basic principles relating to promotion, cooperation, integration, and development of the energy sector of ECOWAS member states. With regard to its energy policy, ECOWAS adopted a decision (A/DEC.3/5/82) to ensure energy security, diversify primary energy sources, and promote increased access to energy. ECOWAS approved a Directive on Gender Mainstreaming in Energy Projects which reiterated the fact that “energy projects have both intended and unintended consequences, including for the human populations in project-affected areas, their livelihoods, their social institutions and practices, and their relationship to the natural and built environments, and that the manner and degree to which energy projects affect individuals, communities, and societies are mediated through gender, among other variables.” Furthermore, one of the key objectives of the directive is to “improve transparency in planning and implementation processes to promote and increase the participation and capacity of women and men, including but not limited to customers, employees, managers, investors, officials and other stakeholders.” SOP #1 will contribute to West Africa’s efforts to boost women’s empowerment and participation in energy sector decisions, while during the overall SOP’s implementation, it will be ensured that women and vulnerable groups’ specific interests are taken into account in the development of the solar projects.

23. The SOP responds directly to the ambitious 1 GW target of the Africa Climate Business Plan (ACBP) of the World Bank Group launched at the Conference of Parties 21 held in Paris in 2015. ACBP includes a target to deliver 1 GW of grid-connected solar and for five million households to gain access to modern energy services through off-grid solar by 2023 (funds raised by 2020) in Sub-Saharan Africa. The ACBP states that “on-grid generation investments, which center on solar PV should be calibrated to optimize additional transmission and distribution needs as well as the region interconnections that play an increasingly important role in overcoming the problems associated with small domestic market size



and improving reliability.” The SOP aims at accelerating the solar power generation and enabling its transmission and distribution across countries in the Broader West Africa Region. Ultimately, the goal is to satisfy the energy needs of the poor with sustainable and affordable electricity and developing integrated, efficient, and reliable power systems. The SOP is also in line with the Sahel Alliance objectives (see paragraph 1) and the World Bank’s Energy Sector Direction Paper (2013)¹⁵ that encourages investments in renewable energy sources as well as the SDGs (2015), which include, in SDG7, provisions toward universal access to modern energy services, doubling the global rate of improvement in energy efficiency, and significantly increasing the share of renewable energy in the global energy mix.

24. The SOP is also aligned with the World Bank Group’s objectives of maximizing the impact of public financing by leveraging, where possible, private sector investments. In March 2017, the World Bank Group presented the Forward Look and introduced the ‘Maximizing Financing for Development Approach’ as a concept to guide the World Bank Group’s efforts to leverage the private sector for growth and sustainable development and focus the Government’s efforts on public goods. The SOP is designed to leverage private capital and optimize the use of scarce public resources in a way that is fiscally, environmentally, and socially sustainable. It will provide a template for how public-sector funding can be used to attract private finance, with the support of MIGA and IFC, while simultaneously leading to improved services to households and consumers.

II. PROJECT DEVELOPMENT OBJECTIVES

A. Project Development Objectives

25. The SOP PDO is to promote the deployment of competitively-procured Regional Solar Parks in West Africa and enable the dispatch of intermittent solar energy.

26. The SOP #1 project-specific PDO is to strengthen the regional technical capacity for preparation of large-scale solar parks and integration of solar electricity into the grids.

B. Project Beneficiaries

27. The SOP-level beneficiaries are West African consumers and households, who will gain from low cost, secure, and clean electricity. The direct SOP beneficiaries include:

- (a) WAPP and the West African countries which will improve their capacity to plan and integrate VRE into their grid;
- (b) State utilities which will gain knowledge and experience in setting up a world-class competitive bidding regime and developing solar parks attracting private sector investment in utility-scale solar, leading to a healthy return on investment and avoided cost of HFO imports;
- (c) Private sector IPPs who will gain opportunities for investment in well-prepared and therefore de-risked solar power projects; and

¹⁵ World Bank, 2013, *Toward a Sustainable Energy Future for All: Direction for the World Bank Group’s Energy Sector*, Report N.79597



- (d) Consumers of electricity in selected countries, who will benefit from enhanced reliability and more affordable electricity services.

28. SOP #1 direct beneficiaries include (a) WAPP and utilities' staff who will be trained; and (b) utilities and ministries who will gain knowledge on preparation of solar parks.

C. PDO-Level Results Indicators

29. The achievement of the PDO at the SOP level will be measured using the following indicators:

- (a) Solar energy generation capacity constructed under the SOP (MW)
- (b) Auctions of large-scale solar competitive procurement schemes following best practice international standards launched (number)
- (c) Private capital mobilized (US\$ million)
- (d) Generation dispatched from solar power plants (GWh)

30. The achievement of the PDO for SOP #1 will be measured using the following indicators:

- (a) Regional grid code revised and adopted by WAPP (Yes/No)
- (b) Staff of WAPP and member utilities trained and certified in VRE integration with a minimum 15 percent women (Number)
- (c) Capacity of large-scale solar projects prepared (MW of solar generation capacity identified and prepared) (MW)

III. PROJECT DESCRIPTION

A. Project Components

31. SOP #1 is designed as technical assistance to WAPP to support the establishment of an enabling framework that would accelerate the deployment of large-scale solar plants in the WAPP region through the identification of technical bottlenecks, preparation of Regional Solar Parks, and knowledge sharing. SOP #1 will be implemented by the WAPP Secretariat in collaboration with the utilities and authorities of the recipient countries. SOP #1 consists of a regional IDA grant of US\$21 million, which will be used toward the identification and preparation of regional investments in solar electricity generation, grid infrastructure, dispatch and storage, along with capacity-building support with a particular focus on planning, regulations, and technical knowledge and resource assessment and validation. Special attention will be given to the integration of gender considerations in both components. This will be achieved mainly through staffing in the ICC and the WAPP Renewable Energy Task Force, as well as in capacity building and training activities, which will serve to reduce the gap in knowledge about gender and female staff in the solar energy sector.



32. The Regional Solar Parks to be developed will need to be part of the WAPP Master Plan to be part of the SOP. In a letter to the World Bank dated March 20, 2017, the WAPP Secretariat has requested support from the World Bank to facilitate the feasibility assessment of selected investments in solar generation included in the current version of the WAPP Master Plan, namely the Burkina Faso and Mali Regional Solar Parks. Both countries have expressed, to WAPP, their interest in seeing these projects reflected in the WAPP Master Plan as regional projects and have supported WAPP in developing the terms of reference for the feasibility studies to be conducted under SOP #1. The WAPP Master Plan is currently being updated and is expected to be finalized by end of year 2018. If there are too many solar projects in the WAPP Master Plan, a prioritization exercise will be conducted based not only on demand-supply balance and the state of grid in the given country, but also with a view of the regional needs.¹⁶ The SOP approach will enable the development of a common project template design addressing the specific issues that are shared between the different countries in the Region and that impede the deployment of solar PV. The viability and scope of prospective projects will be confirmed by activities carried out under SOP #1.

33. Component 1: Regional Solar Integration, Dispatch, and Capacity Building (US\$8 million equivalent). SOP #1 proposes to support WAPP member utilities and WAPP to strengthen their dispatch, grid integration and planning capacities, and VRE production monitoring capabilities by:

- (a) Reinforcing the ICC¹⁷ with the creation of a unit dedicated to VRE to enable WAPP to monitor the volume and quality of intermittent power generation within the different interconnected zones through the provision of equipment, consulting services and training;
- (b) Creating a WAPP Renewable Energy Task Force with all WAPP member utilities vested with responsibility to (i) support an increased coordination and knowledge sharing on VRE issues between WAPP countries and their respective utilities, including through studies required to monitor and support the development of VRE projects; and (ii) share knowledge on planning, procuring and integrating solar generation into the grid, and through the provision of consulting services and training;
- (c) Supporting the definition and implementation of a regional grid code with VRE connection requirements for member utilities through the provision of consulting services;
- (d) Capacity building and training implemented with the support of and in line with the WBCIP on grid integration and dispatch with a priority on increasing women in the workforce, with a particular focus on providing opportunities for female experts, for skills development to achieve internationally recognized best practices in electrical power systems planning, operation, maintenance and assets management and other areas deemed necessary for the development of technological relevant, technically robust/resilient, economically, environmentally and socially sound power systems, and encompassing the provision of consulting services and training; and

¹⁶ Precise criteria will be developed further by WAPP with the support of its member utilities when an oversupply of regional solar projects arises.

¹⁷ The control center, supplied by GE Alstom, supervised by EDF, and funded by the European Union (EU), has begun construction and is expected to be commissioned at the end of 2019 in Cotonou. The project will provide the ICC with equipment (laptops, tables, chairs, etc.), software and trainings.



- (e) Reinforcing the WAPP staff capacities, focusing on WAPP's Planning, Investment Programming, and Environmental Safeguards Department, by financing key staff and consultants to support the design and implementation of SOP #1.

34. Component 2: Regional Solar Parks Preparation (US\$13 million equivalent). SOP #1 proposes to support WAPP's Planning, Investment Programming, and Environmental Safeguards Department to:

- (a) Identify and prepare regional solar generation projects and associated grid investments, in close coordination with WAPP members, IFC, MIGA, and development partners. Such projects could include the Burkina Faso Regional Solar Park, the Mali Regional Solar Park, and solar generation facilities tied to hydropower plants (using for instance floating solar technology), such as solar generation tied to Manantali dam. Activities will include, but not limited to, grid integration studies, pre-feasibility and feasibility studies, the documentation on project structuring, the definition of the most suitable implementation arrangements determining ownership and operation, and the preparation and documentation of the solar auction (see Annex 1).
- (b) Roll out a solar resource ground measurement campaign in multiple locations across the region to improve overall knowledge of the solar resource and siting of solar plants, and to reduce uncertainties on the solar resource.

B. Project Cost and Financing

35. A total of US\$21 million equivalent IDA grant financing will be committed to SOP #1 of which US\$5 million as part of a project preparation advance approved in February 2018. The advance covers feasibility studies for the Burkina Faso and Mali Regional Solar Parks, an environmental and social study for the Burkina Faso Solar Park, services of a transaction adviser to develop the solar auction scheme for the solar park that will be ready first, study of the WAPP ICC needs for reinforcements related to solar energy, and costs of a VRE technical expert supporting WAPP and its member utilities to develop the task force.

C. Series of Projects: Objectives and Phases

36. The Solar Development in Sub-Saharan Africa SOP is a multi-country, multiphase overlapping SOP focusing on supporting the deployment of solar power in the Region. The SOP builds upon continuous support from IDA to the three key organizations that are enabling this regional integration: OMVS, OMVG, and the Special Purpose Vehicle created for the CLSG. The SOP will be implemented in coordination with the proposed World Bank technical assistance for enhancing cross-border payment securitization in the WAPP region and will complement other regional initiatives, such as the Sahel Alliance and the West Africa Clean Energy Corridor, which advocates accelerating the development of solar resources in West Africa, under the Sustainable Energy for All initiative, supported by International Renewable Energy Agency (IRENA) and the EU.

37. The conditions necessary for future projects to become a part of the subsequent SOPs are: (a) the project is identified as a priority project in the WAPP Master Plan; (b) investment readiness (state of advancement of feasibility study and viability of the project based on the economic and financial analysis in SOP #1); and (c) a national request for the World Bank Group's support. Investment readiness



will determine the order of projects in the series. For future SOPs, carbon credit and climate finance could be considered. Among the potential investments currently part of the WAPP Master Plan, the following are the most advanced and most likely to be supported by subsequent projects in the SOP:

- (a) **SOP #2: Burkina Faso Regional Solar Park (150 MW), FY20.**¹⁸ Under the coordination of WAPP, the pre-feasibility study and the pre-identification of potential sites for the Burkina Faso Regional Solar Park were completed in February 2017, with support from the EU and the German Government-owned development bank *Kreditanstalt für Wiederaufbau* (KfW). Based on the pre-feasibility study, preliminary discussions with the client, and financial modelling, the Burkina Faso Regional Solar Park is expected to have a large storage size of 100 MWh+ to enable smooth and stable dispatch of electricity and a shift of three to four hours of electricity to partially cover the evening demand peak during which the Burkina Faso system is currently under most stress. The preliminary financial analysis shows that it is possible to size the storage in a way that it contributes significantly to the evening peak demand, yet the resulting power is still cheaper than the current imports from Côte d'Ivoire and HFO-based generation that cover the evening peak demand currently in Burkina Faso. Other considerations to be taken into account by the feasibility study is the cost comparison of other import options from the new transmission lines to be commissioned: Ghana-Burkina Faso by December 2018 and North Core (Nigeria-Niger-Benin and Burkina Faso), currently under preparation. These interconnectors will also serve to reinforce Burkina Faso's national grid and enable greater integration of VRE.
- (b) **SOP #3: Mali Regional Solar Park (150 MW), FY21.** The Mali Regional Solar Park is included in the WAPP Master Plan and a pre-feasibility study has been completed. The Mali Regional Solar Park will be conceived in an integrative way along with transmission lines linking Mali to Guinea and the solar generation will therefore serve those two markets. The Guinea-Mali Interconnector Project is part of the WAPP infrastructure investment pipeline for the creation of a regional power pool in West Africa and is currently under preparation with an IDA contribution of US\$84 million. This interconnection will contribute to increased regional energy trade and facilitate integration of renewable energy from the Mali Regional Solar Park and other national projects.
- (c) **SOP #4: OMVS Hydro-connected Solar Project, FY20.** This project will support the addition of solar PV capacity—floating or ground mounted in the perimeter of the dam—in one of the several existing regional hydropower dam reservoirs of the West Africa Region, such as the Manantali dam. OMVS through *Société de Gestion de l'Energie de Manantali* has expressed interest to explore a possibility of additional solar-based power generation in its grid to mitigate dry season shortfalls and help with the reservoir's water management. Such complementary solar generation will then serve the same markets as the hydropower generation coming from the dam, that is, Mauritania, Mali, and Senegal, who own the Manantali dam.

¹⁸ The timing of the subsequent SOPs will depend on the availability of national IDA.



D. Lessons Learned and Reflected in the Project Design

38. The SOP builds on an increasing body of evidence of how best to facilitate private sector investment and ensure sustainability, drawing on lessons learned in the region and internationally.

These include the following:

- **Proper planning and efficient grid dispatch are key to increasing VRE penetration in the grid.** Proper VRE integration needs to consider multiple issues including (a) dispatch issues related to the flexibility of conventional plants (ramp rates, part-load, and so on) to address the variability of VRE plants; and (b) stability issues related to the ‘inertia’ of the grid (measured in seconds), as without sufficient inertia the system will reach critical levels of under-frequency possibly leading to system collapse. Combining battery storage with the VRE plants can significantly improve performance of hybrid plants compared to a simple VRE plant, such as proposed for all Regional Solar Parks.
- **Additional detailed studies such as curtailment scenarios are necessary in countries with weak yet rapidly developing grids and little to no spinning reserves.** Multiple studies to evaluate the impact of high levels of VRE penetration on network stability have been conducted for some countries in the Region (for example, Senegal, Burkina Faso, and Niger). With rapid and often uncoordinated expansion of capacity through multiple PV plants, the operational constraints and technical/financial implications of such capacity increases need to be assessed. The objective is to understand PV curtailment under the least-cost generation dispatch and contrast it with the curtailment in a case where additional spinning reserves/frequency regulation means could be provided (through the existing IPPs, storage, or small engines). This process helps identify the dispatch rules and investments that will help utilities reduce curtailment costs. Such studies provide a sound technical basis upon which the governments, utilities, donors, and developers can be confident in the technical feasibility of grid-connected solar PV in weak power systems as included in the SOP.
- **Facilitating private sector involvement is crucial for fiscal sustainability and technical quality of large-scale solar development.** Consistent with the MFD approach, strategically using public funding to leverage private sector investment and expertise is central to this SOP. Solar parks with shared infrastructure are a typical example of satisfying the abovementioned principles. In solar parks, a relatively small amount of public investment in land, permits, and evacuation help de-risk project development. The competitive award of PPAs in solar parks to private developers and operators then results in high-quality solar plants that can deliver power at low tariffs. This has already been demonstrated in the World Bank Group-supported projects in Argentina, India and Zambia.¹⁹
- **Good data are important for proper project identification and lead to better projects.** Experience from other similar projects shows that high-quality data can substantially improve the design and implementation of solar projects. In Zambia, as part of the Scaling Solar Program, the Government built on data from ground-based solar measurements and carried out a comprehensive site identification process, involving assessment of daily load

¹⁹ Projects FODER – Argentina Renewable Fund Guarantee (P159901), Shared Infrastructure for Solar Parks Project (P154283), and Zambia Scaling Solar IFC 37811 / Zambia Scaling Solar Energy Guarantee Project (P157943) respectively.



profiles in selected cities, potential yield of a solar PV plant near selected cities, proximity to evacuation infrastructure, and assessment of the impact of solar PV plants on the transmission system. The same will be done as part of the feasibility studies supported under this SOP.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

39. The WAPP Secretariat has been identified as the institution that is best suited to implement technical assistance at a regional level. WAPP is a public international organization operating in the general interest of the regional power systems, with a view to ensuring reliable power supply throughout the Region. WAPP comprises 25 member utilities - public and private power generation, transmission, and distribution utilities - involved in the operation of the West African power system. The WAPP Secretariat has three main divisions: (i) Planning, Investment Programming, and Environmental Safeguards Department; (ii) ICC; and (iii) Administrative and Finance Unit. WAPP is already a successful implementing agency of the World Bank's large technical assistance programs in the Region and investments in transmission lines. There is also a considerable advantage in making WAPP the implementing agency of the proposed SOP, as WAPP has been designated as part of the institutional mandate of ECOWAS to promote and develop infrastructure for power generation and transmission and coordinate power exchanges among ECOWAS member states.

40. Dedicated staff within WAPP and consultants to be hired to support WAPP will be responsible for SOP #1 management and supervision. WAPP has allocated to SOP #1, a project coordinator, an environment specialist, a capacity-building coordinator, and a financial management (FM) specialist. An expert consultant in VRE and integration, will be hired under SOP #1, as well as a social/gender specialist (part-time consultant), an accountant, and a procurement specialist who will be working part-time for the project. All consultants will be hired with a preference for experts from the region. WAPP's gender analyst will work in coordination with the social expert and the World Bank's expert on the development of gender gap analysis and the capacity-building activities. The unit's scope of work will include (a) supervision and verification of survey, design, and preparation of cost estimates of SOP #1 interventions; (b) verification of design, bill of quantities, and tender documents of SOP #1 activities; (c) preparation of annual work plans for all SOP #1 activities and annual financial requirements; and (d) supervision and reporting on SOP #1 implementation.

41. WAPP has well-established coordination procedures with national counterparts in member states. The WAPP operations closely associate with national counterparts to ensure appropriate and early buy-in from the utilities and governments in each country involved in activities spanning technical, economic, financial, environmental and social, commercial, regulatory, and transactional support. Focal points will be designated, within utilities and line ministries of the concerned countries, to participate alongside the WAPP Secretariat in dedicated committees established to follow, review, and approve deliverables to be prepared under Component 2 of SOP #1. The WAPP Secretariat will support the preparation of safeguards instruments, including the identification of project-affected people, to be approved by the relevant national authorities. A team of safeguard experts will be established and maintained within the General Secretariat and shall include one environmental specialist, one social specialist, one dam specialist, or any other specialists as may have been agreed with the World Bank.



B. Results Monitoring and Evaluation

42. The project-level monitoring and evaluation (M&E) framework will track progress in implementation and measure PDO level and intermediate outcomes. The Results Framework outlines key performance indicators, data collection methods, a timetable for collection, and responsible agencies. WAPP will submit quarterly reports to the World Bank no later than 45 days after the end of each quarter. The quarterly reports will cover the progress and updates on procurement activities, FM, and disbursements, as well as implementation issues and associated action plans, progress on indicators and targets, and status of financing agreement covenants. Data collecting and reporting responsibilities will be described in the Project Implementation Manual. A gender-sensitive M&E plan will be implemented supported by sex-disaggregated data.

C. Sustainability

43. SOP #1's main aim is to strengthen WAPP's capacity to ensure sustainability of the regional effort to develop solar power at scale. The creation of a Renewable Energy Task Force to build, develop, and sustain expertise over the long run across WAPP member utilities on VRE integration, will shape and support sustainability of the capacity-building program of WAPP. The Renewable Energy Task Force's work program will be shaped, with the WBCIP's help, to incorporate state-of-art knowledge and lessons learned, in a sustainable manner so the task force stays relevant beyond the life of SOP #1. In addition, by promoting private sector engagement across the SOP, the SOP aims to ensure commercial and technical sustainability, while supporting the sustainability of the grids' infrastructure. The SOP also has strong built-in environmental sustainability as supporting the scale-up of solar power will help reduce GHG emissions.

D. Role of Partners

44. The SOP has attracted strong interest from donors, including KfW, EU, and the French Development Agency (*Agence Française de Développement, AFD*). KfW is already actively exploring support to the Burkina Faso Regional Solar Park and is interested in collaborating on the potential hydro-connected solar PV projects, and the EU has financed the pre-feasibility study for the Regional Solar Park in Mali. The Energy Sector Management Assistance Program is providing grant funding for World Bank-executed studies supporting pre-identification of further possible projects for the entire SOP. There will be a coordinated effort with the other donors with regard to capacity building to ensure that the SOP complements other initiatives already in place such as IRENA's and United States Agency for International Development's on-grid planning and PPAs.

V. KEY RISKS

A. Overall Risk Rating and Explanation of Key Risks

45. The risk associated with the overall SOP is rated Substantial. This assessment reflects a combination of factors, at sector, technical, transactional, and stakeholder levels that are replicated across multiple selected countries, although differences among countries exist. The main risks identified with the SOP are as follows:

- (a) **Lack of creditworthiness and weak sector planning and regulation.** Electricity off-takers in



the Region are not creditworthy and, as a result, national utilities largely rely on budget transfers and/or on sovereign guarantees for critical investments in the sector. This risk will limit private sector interest in the projects developed and increase the PPA price if not tackled beforehand. The capacity to plan the development of the sector and continuously update it as the sector evolves is limited, particularly, for renewable energy. Sector regulations are, in most cases, only partially effective. This creates risks on, but not limited to, permitting issuance, land tenure, law and regulation enforcement. A fully structured bidding process prepared under SOP #1, coupled with de-risking tools such as IDA Partial Risk Guarantees that could be made available under subsequent operations (SOP #2–4), will mitigate the off-takers' creditworthiness risk. Moreover, at the national level, specific DPFs are focusing on improving the financial viability of utilities.

- (b) **Limited local experience and capacity related to solar power development.** Solar power technologies are innovative in West Africa and the Sahel, given the limited capacity installed in most of the selected countries and hence, the limited local experience in the implementation, management, and maintenance of solar plants. This is also true for upgraded and modernized infrastructure to dispatch and transmit electricity, which requires skills to use both the hardware and software involved. Local stakeholders with experience in planning and integrating solar energy in power systems are rare and their experience today is limited. This impacts the risk of curtailment of the project, and the construction and design of the plant. Capacity building and lesson sharing through the working groups of the Renewable Energy Task Force, supported under SOP #1, will be key to reducing this specific risk for subsequent investments operations (SOP #2–4).
- (c) **Lack of competition resulting in delays and high tariffs.** Most of the currently awarded or operating solar IPPs in the Region have been sole-sourced or resulted from unsolicited bids. This has led to higher tariffs and delays in reaching financial closure. By fostering competition, a fully structured bidding process, is more likely to lead to least-cost supply options, compared to negotiated deals. With a specific set of technical and commercial criteria defined upfront, a structured process will reduce variations among the bids, simplify the evaluation, and shorten the negotiation with prequalified sponsors. Bid evaluation will be based on quantitative criteria, thereby increasing transparency. With de-risking options set up-front, the process is expected to ultimately reduce tariffs and delays in reaching financial closure. A definitive shift toward a fully structured bidding process may require changes in IPP/PPP regulatory frameworks and standard procurement schemes. To mitigate this risk, the preparation of solar parks projects under SOP #1 will include support for IPP/PPP structuring to be agreed upon before the subsequent investment operations (SOP #2–4).
- (d) **Coordination issues between WAPP and country utilities responsible for the development of projects.** While WAPP is responsible for the overall regional coordination of energy sector activities and new projects, often utilities in each country have their own priorities and domestic plans for energy diversification. The WAPP Master Plan, currently under revision in a participatory manner under WAPP leadership, is an opportunity to align priorities among stakeholders and consensually identify transformational projects for an effective diversification of the regional energy mix toward solar sources. To mitigate a potential weak coordination between WAPP and the utility, the solar parks eligible for SOP support should



be (i) identified as priority projects in the updated WAPP Master Plan; (ii) proved viable from a technical, economic, and financial standpoint (through studies carried out under SOP #1); and (iii) formally requested by national authorities (see paragraph 31-32 on conditions for subsequent operations).

- (e) **The fragile security situation in the Sahel region may weaken competition and increase costs for solar parks.** There is a security risk in parts of the Region, especially in the Sahel. This risk will be mitigated by factoring the security dimension in project identification and preparation. The security risk will be assessed and integrated in the development of the Regional Solar Parks (under SOP #1) to maintain effective competition and minimize premiums expected from the private sector for subsequent SOPs.

46. The overall risk associated with SOP #1 is Moderate. Technical assistance activities defined in SOP #1 aim to mitigate the risks associated with the overall SOP. The various risks related to the project were assessed through the Systematic Operations Risk-Rating Tool (SORT) according to Table 1. According to the World Bank's guidelines,²⁰ this assessment is based on the risks to achieving results and of adverse unintended consequences on the achievement of the proposed technical assistance project's PDO (SOP #1), as opposed to the overall SOP's PDO (for which the main risks have been presented earlier). The risks rated 'Substantial' and pertinent mitigation actions are described in the following paragraphs.

Table 1. Systematic Operations Risk-Rating Tool (SORT)

Risk Categories	Rating (SOP #1)
1. Political and governance	Moderate
2. Macroeconomic	Low
3. Sector strategies and policies	Moderate
4. Technical design of the project	Moderate
5. Institutional capacity for implementation and sustainability	Moderate
6. Fiduciary	Moderate
7. Environmental and social	Low
8. Stakeholders	Substantial
9. Others (Security)	Substantial ²¹
Overall	Moderate

47. Environmental and social risks are Low. SOP #1 contains only technical assistance activities like diverse studies, workshops, and hiring of consultants. SOP #1 will prepare environmental and social studies for subsequent investment projects that will be part of the overall SOP. However, as the subsequent SOPs being prepared under SOP #1 can lead to investments connected to existing dams and new transmission lines, the project is evaluated as Category A. The Terms of Reference for a generic ESIA were agreed upon and disclosed on April 25, 2018.

48. Stakeholder-related risks are Substantial. Even if the WAPP Secretariat has a strong track record with regard to World Bank projects, the proposed investments to be prepared under SOP #1 will ultimately rely on country-level engagements and thus require active buy-in from member countries from the early preparation stages. The risk of client nonadherence to proposed investments will be mitigated by close

²⁰ *Guidance Note, Systematic Operation Risk-Rating Tool (SORT), June 25, 2014.*

²¹ As described in paragraph 45 (e)



and continuous involvement of the respective countries through utilities and line-ministry representatives throughout SOP #1 technical assistance activities. WAPP has in place coordination procedures applicable to SOP#1 project preparation activities to ensure appropriate buy-in from the utilities and governments for each country where an investment project is to be supported by the series (see paragraphs 10 and 37). This process will ensure full ownership of the final outputs by countries, their authorities, and their utilities. Activities under Component 1 will contribute to actively engage member countries and utilities, which may not directly benefit from investments under subsequent SOPs, and build human capacities related to VRE across the entire Region.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

49. The proposed SOP #1 has an intrinsic rationale for public provision, because of its nature—technical assistance—and its scope. Strengthening the WAPP and members countries' technical, institutional, regulatory, and project implementation capacities is essential to ensure that the solar power potential in the region is efficiently and sustainably used, with benefits equitably shared by the society at large.

50. An economic analysis cannot be done for SOP #1 because it is a technical assistance project. Care will be taken however to ensure cost-efficiency in terms of the resources deployed through consultancies and studies. As such, this regional operation, takes advantage of economies of scale of undertaking activities at a regional level rather than for each individual member utility, thus creating synergies and avoiding potential duplication. In terms of economic benefits for the investment projects, a preliminary economic and financial analysis was conducted for the Burkina Faso Regional Solar Park with 150 MW PV plant and 120 MWh of storage. The investment proved economically viable, with a levelized cost of electricity at around US\$0.10 per kWh, below the actual average cost of electricity generation in most WAPP countries and in Burkina Faso, where it also is lower than electricity import prices.

51. The World Bank will bring significant value added to the SOP in light of its experience in supporting utility-scale solar PV project development in Africa and other developing regions. The World Bank institutional and regulatory support, transaction advice, and/or risk mitigation can help raise project bankability and reach financial closure in a timely and efficient manner, especially in countries relatively new to IPPs and with low regulatory capacity. The World Bank has also been at the forefront in supporting regional power integration in West Africa and is well positioned to convene clients, the private sector and developing partners to leverage investment for regional projects.

52. Specifically, large regional solar projects with storage are expected to lead to the following benefits:

- (a) Increased levels of on-grid electricity access;
- (b) Reduced average unit cost of electricity;
- (c) Reduced consumption and cost of imports of HFO, the primary fuel that solar electricity generation displaces;
- (d) Improved integration of solar electricity into the grids, including from IPPs, due to systemwide analyses and investments into grid and dispatch improvements accompanying



- solar park infrastructure investments;
- (e) Reduced GHG emissions; and
- (f) Increased capital mobilization from commercial sources and private sector involvement in electricity generation.

B. Technical Analysis

53. SOP #1 consists of an IDA technical assistance grant that will support WAPP and its members in development and integration of large-scale solar facilities in the WAPP Regional Network. Technical assistance activities will serve as a guide for those wishing to (a) invest in the development of PV generation in the form of solar parks; and (b) enhance their ability to operate power systems affected by high levels of VRE penetration in weak grids.

54. According to the approach for climate co-benefits assessment laid out in the 2016 Joint Report on Multilateral Development Banks' Climate Finance,²² SOP #1 can claim 100 percent climate co-benefits as it is a Category 1.1 Renewable Energy Solar Project. The climate and disaster screening was conducted and it was assessed that there will be no climate impacts on the project. SOP #1 is not subject to GHG accounting requirements because it is a technical assistance project and accounting for future investments will be done in subsequent projects of the series (to avoid corporate double-counting).

C. Financial Management

55. Subject to the recommended mitigation measures and action plan being implemented by WAPP, according to the agreed timeframe, SOP #1 has a FM risk rating of Moderate and has met the minimum FM requirements in accordance with the World Bank's Policy on Investment Project Financing. The WAPP Secretariat is familiar with the World Bank's FM requirements and is currently implementing a WAPP Integration and Technical Assistance Project as part of the WAPP APL4 (Phase 1) - Côte d'Ivoire, Sierra Leone, Liberia, and Guinea Power System Re-development Project (P113266) funded by the World Bank. The project's FM performance was rated Satisfactory following the last supervision mission of February 2017. The proposed FM arrangements, including the mitigation measures for SOP #1 are considered adequate to meet the World Bank's minimum fiduciary requirements. Further details are provided in Annex 2.

D. Procurement

56. The WAPP will follow the World Bank Procurement Regulations and systems for SOP #1, including for any expenditures under the Project Preparation Advance. WAPP will carry out procurement for the SOP in accordance with the World Bank's 'Procurement Regulations for IPF Borrowers', dated July 2016 and revised in November 2017 under the 'New Procurement Framework', 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 July 1, 2016, and other provisions stipulated in the Financing Agreement. WAPP has already conducted procurement activities for the World Bank projects (WAPP Integration and Technical Assistance Project) in a moderately satisfactory manner. Before onboarding its own procurement specialist, WAPP had recruited, in July 2017 under a WAPP Grant fund, a senior procurement consultant for one year with the possible extension of his contract for another

²² European Investment Bank. 2016. *Joint Report on Multilateral Development Banks' Climate Finance*.



year. The senior procurement consultant is serving the organization for two years and a competitive international recruitment for a permanent senior procurement specialist will be carried out by WAPP for a three-year contract. The WAPP is conducting a recruitment process for a procurement specialist who will be in charge of the SOP.

57. WAPP prepared a Project Procurement Strategy for Development (PPSD) which describes how procurement activities will support project operations for the achievement of the PDO and deliver Value for Money (VfM). The procurement strategy is linked to the project implementation strategy at sub-regional and country levels ensuring proper sequencing of the activities. It considers institutional arrangements for procurement, roles and responsibilities, thresholds, procurement methods, and prior review, and the requirements for carrying out procurement. It also includes a detailed assessment and description of the state government's capacity for carrying out procurement and managing contract implementation, within an acceptable governance structure and accountability framework. Other issues considered include the behaviors, trends, and capabilities of the market (that is, market analysis) to respond to the Procurement Plan. The World Bank's Systematic Tracking of Exchanges in Procurement (STEP) planning and tracking system, will be used. Further details are provided in Annex 2.

E. Social (including Safeguards)

58. The SOP is expected to have highly positive direct and indirect social impacts, including improvement in electricity supply, increased electricity access, and employment generation while SOP #1 is not expected to have any negative social impacts. Still, OP 4.12 on Involuntary Resettlement is triggered for this project because the technical assistance Component 2 will support the preparation of pre-feasibility and feasibility studies for future investments. To this end, the terms of reference for an ESIA was prepared and cleared by WAPP and cleared by the World Bank and disclosed on April 25, 2018. This will guide the preparation of subsequent instruments (ESIA and RAP, as necessary) in the participating countries during implementation once the other studies provide more information.

59. Given the gender gap of women's employment within the energy sector and the need to improve gender equity within energy utilities, an effort will be made to ensure that the capacity-building activities target women. Activities will expand the number of women staff being trained. Women have traditionally been underrepresented within the energy sector. While there is limited research, the data that exist show that women have been excluded from employment opportunities in these areas of work and that there are substantial gender gaps at various grades, particularly at the leadership levels. Women are especially underrepresented in the generation, transmission, and distribution of electric power. A 2016 gender analysis of the WAPP Secretariat also identified that at the institutional level, women are highly underrepresented. A recent analysis of 14 energy utilities highlights these disparities: on average, women make up 13 percent of the workforce.²³ Initiatives to effectively address gender issues in field operations are rare. Utilities often lack capacity to build gender awareness and sensitivity within all business units or develop gender policies that apply consistently across contexts and are aligned with country regulations. One key barrier to identifying gender gaps during community consultations, at the project planning stage, is the paucity of women representatives within the utility company who could establish direct relationships with women in the project-affected communities. The level of female representation in the utilities vary and can be explained by sociocultural and gender norms in a country,

²³ Excerpt from forthcoming World Bank (Inka Schomer and Alicia Hammer) Background Note: *The Women in STEM: Promoting Women's Employment in Infrastructure Sectors*.



as well as a cascading effect, that is, as more women begin working in the sector, they act as role models, and open opportunities for others.

60. Citizen engagement. For SOP #1, because it is a technical assistance project and there are no actual physical investments, citizen engagement will be done through the safeguards studies, which will be completed in consultation with the potentially affected population. The ESIA/RAP will consider gender aspects and vulnerable groups. Going forward, during subsequent SOPs, the project will look to improve the service provision aspects of the national utilities through an enhanced feedback mechanism (for instance, an SMS service or female local agents who serve as the interface between the end consumers and the utility).

61. WAPP will establish, maintain and operate a functional complaint handling mechanism for SOP #1. The mechanism shall be established no later than three months after the Effective Date, and will have adequate staffing and processes for registering complaints and acceptable to the World Bank, thereby ensuring the ongoing improvement on service delivery under SOP #1.

F. Environment (including Safeguards)

62. The overall SOP will lead to substantial direct environmental benefits, such as a reduction in GHG emissions, by increasing the development of solar energy, while SOP #1 is not expected to have any environmental impacts. No physical investments or activities will take place in the participating countries under SOP #1. However, Environmental Assessment OP/BP 4.01, Natural Habitats OP/BP 4.04, Physical Cultural Resources OP/BP 4.11 and Safety of Dams OP/BP 4.37 are triggered as SOP #1 will support the preparation of pre-feasibility and feasibility studies, as well as Environmental and Social Management Plans (ESMPs) and ESIA of future solar projects that could be hydro-connected and new transmission lines may be part of the future investment. Feasibility and environmental studies leading to the design of these projects are subject to and classified in the same category as the upcoming investment projects in subsequent SOPs. As presented in paragraph 47, as the subsequent SOPs being prepared under SOP #1 can lead to investments connected to existing dams and new transmission lines, the project is determined to be Category A.

G. Other Safeguard Policies

63. No other safeguards are expected to be triggered.

H. World Bank Grievance Redress

64. Communities and individuals who believe that they are adversely affected by a World Bank supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRM). The GRM 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 Inspection Panel which determines whether harm occurred, or could occur, as a result of World Bank non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and World Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate GRS, please visit <http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service>. For



information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.



VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

Project Development Objective(s)

The Series of Projects' development objective (PDO) is to promote the deployment of competitively-procured Regional Solar Parks in West Africa and enable the dispatch of variable solar energy.

SOP #1 project specific PDO is to strengthen the regional technical capacity for preparation of large-scale solar parks and integration of solar electricity into the grids

PDO Indicators by Objectives / Outcomes	DLI	CRI	Unit of Measure	Baseline	End Target
Strengthen regional technical capacity for integration of solar electricity into the grids					
Regional grid code revised and adopted by WAPP			Yes/No	N	Y
Staff of WAPP and member utilities trained and certified in VRE integration with a minimum 15 percent women			Number	0.00	100.00
Strengthen regional technical capacity for preparation of large-scale solar parks					
Capacity of large-scale solar projects prepared (MW of solar generation capacity identified and prepared)			Megawatt	0.00	500.00



Intermediate Results Indicators by Components	DLI	CRI	Unit of Measure	Baseline	End Target
Regional Solar Integration, Dispatch and Capacity Building					
ICC center equipped with renewable energy post			Yes/No	N	Y
Regional Solar Parks Preparation					
Solar ground measurement campaign undertaken in the region (number of sites measured)			Number	0.00	25.00
Feedback from safeguards-related consultations with affected populations, including with vulnerable groups and women, documented, disclosed and taken into account in project design			Yes/No	N	Y

Monitoring & Evaluation Plan: PDO Indicators	
Indicator Name	Regional grid code revised and adopted by WAPP
Definition/Description	
Frequency	Annual
Data Source	WAPP Annual Report
Methodology for Data Collection	
Responsibility for Data Collection	WAPP



Indicator Name	Staff of WAPP and member utilities trained and certified in VRE integration with a minimum 15 percent women
Definition/Description	Note: The current percentage of women in the staff of WAPP member utilities is currently unknown, but analysis made in other utilities as well as the gender-analysis of the WAPP secretariat point to a low range of 1-13% female staff. Capacity building efforts will be prioritized towards women in WAPP member utilities with a view to reach at least 15% of female being certified (to be confirmed by the gap analysis).
Frequency	Annual
Data Source	Project Reports
Methodology for Data Collection	
Responsibility for Data Collection	WAPP
Indicator Name	Capacity of large-scale solar projects prepared (MW of solar generation capacity identified and prepared)
Definition/Description	
Frequency	Annual
Data Source	Project Reports
Methodology for Data Collection	
Responsibility for Data Collection	WAPP



Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	ICC center equipped with renewable energy post
Definition/Description	
Frequency	Annual
Data Source	Report Project
Methodology for Data Collection	
Responsibility for Data Collection	WAPP
Indicator Name	Solar ground measurement campaign undertaken in the region (number of sites measured)
Definition/Description	
Frequency	Annual
Data Source	Project Reports
Methodology for Data Collection	
Responsibility for Data Collection	WAPP



Indicator Name	Feedback from safeguards-related consultations with affected populations, including with vulnerable groups and women, documented, disclosed and taken into account in project design
Definition/Description	
Frequency	Annual
Data Source	Project Reports
Methodology for Data Collection	
Responsibility for Data Collection	WAPP



ANNEX 1: DETAILED PROJECT DESCRIPTION

Western Africa

Solar Development in Sub-Saharan Africa - Phase 1 (Sahel)

Background

1. The Solar Development in Sub-Saharan Africa SOP is focusing on supporting large-scale solar deployment in a sustainable, well-planned, and cost-effective way. Indeed, a regionally focused generation plan can maximize the use of generation, while reducing the overall cost to the system as analyzed under the World Bank's Optimal System Planning for the WAPP region (see Box 1.1). Two components were identified for SOP #1 to support (a) regional solar integration, dispatch and capacity building and (b) Regional Solar Parks preparation.

Box 1.1. World Bank's Optimal System Planning for WAPP Region

The World Bank's Electricity Planning Model was used to undertake a system-level planning analysis at a regional level to determine the optimal generation capacity additions necessary to supply the expected demand for electricity in the WAPP region until 2030. The analysis assumed competitive trade of electricity among countries within WAPP and included existing and planned regional interconnections. Candidate solar technologies for generation expansion included solar PV (with a cost of capital ranging from US\$1 to US\$1.4 million per MW) and CSP with thermal storage (with a cost of capital of US\$4 million per MW).

The analysis found that, in general, countries with access to gas resources—either through local fields (Côte d'Ivoire, Ghana, and Nigeria) or through liquefied natural gas in the future (Senegal and Togo-Benin)—rely heavily on gas-based generation as it is comparatively cheaper than any other available resource. Countries with no access to gas resources rely on expensive HFO—which is purchased at prices ranging from US\$10 to 28 per million British thermal unit—and electricity imports from neighboring countries. At the regional level, the analysis found that regional trade can potentially save up to 11 percent of the total yearly generation costs (compared to a scenario with no energy exchanges between countries; and including amortization, fuel, and Operation and Maintenance costs), and avoid up to 5 GW of generation capacity by 2030 (which amounts to 6.5 percent of the total estimated generation capacity in the region in 2030). This result underscores the importance of regional trade and coordination, enabled by the regional transmission network, and access to a competitive market for electricity in the region.

Based on resource assessment studies, the region has a vast solar potential. Solar PV may be economically deployed in countries with no access to gas resources and good solar irradiation, substituting expensive HFO-based generation. In isolated areas with good solar resource and need for storage, CSP might also potentially play a role to contribute to providing spinning reserves if the higher capital cost is justified.

Modeling per country is ongoing but a detailed assessment of Burkina Faso's least-cost electricity generation expansion was completed. In Burkina Faso, solar power could supply a significant amount of the total electricity demand if the country operates under existing trade contracts. The remaining share of the demand will be supplied by HFO and electricity imports in similar proportions. In the long run, assuming that the regional interconnection plans are realized and a competitive regional market is established, the share of solar energy could be increased provided the capital cost of solar stays at or goes below US\$1 million per MW. With a regional market, Burkina Faso could leverage the flexibility provided by regional interconnections (notably those from Côte d'Ivoire and Ghana), which will allow for an optimized utilization of the solar assets. Under this scenario, reliance on imports will increase to complement solar variability, dramatically reducing local HFO generation and the carbon footprint of the electricity sector in Burkina Faso, but increasing dependence on foreign-based electricity generation. Clearly, the model shows that Burkina Faso will remain a net importer of electricity, but that the availability of cheap solar electricity generation will enable the country to export electricity during some hours of



the day.

The analysis was replicated to calculate optimal generation capacity additions if countries in the WAPP region operate in isolation, to analyze, by comparison, the effect of trade in the region. The analysis found that, without trade, countries with no access to gas or hydro resources cannot rely on imports to supply new electricity demand, and would deploy a mix of new HFO and new solar PV capacity, at an approximate ratio of 1:2, with capital costs of US\$1.9 million per MW and US\$1 million per MW respectively. Interestingly, CSP also enters the mix in countries with good solar resources and without access to hydro or gas-fired generation to provide lower cost generation than HFO and reserves (Mali and Niger).

Component 1: Regional Solar Integration, Dispatch, and Capacity Building (US\$8 million equivalent)

2. Component 1 includes the following activities:

- (a) **Modernization of the WAPP ICC with a dedicated platform for VRE supervision.** The WAPP ICC serves as the central monitoring and electricity trading hub. The objectives of the ICC are to promote operational coordination between transmission owning/operating WAPP members and actual day-to-day information sharing/exchange between WAPP operational coordination centers and to facilitate efficient trading of power between entities in the different countries that are interconnected. The main responsibilities of ICC are to (i) collect, analyze, and disseminate the information needed to gauge the evolution of interconnected electricity generation and transmission systems in the Region; (ii) monitor the development of the national electric power sector in ECOWAS member states to forewarn the risks of performance deficiencies and provide corrective measures; (iii) periodically analyze the economic and technical viability of cross-border electricity trading arrangements among transmission using members; (iv) facilitate the development of technical norms and standards for the collection and treatment of useful information for the efficient operation of the national and interconnected electric networks; and (v) support and monitor the technical performance of the electricity utilities. Monitoring by the ICC of electricity traded within the Region's high voltage electricity grid will also help trading utilities monitor volumes being traded, invoiced, and paid. The proposed activity will conduct a study based on the diagnosis of the ICC to establish the required investments for the implementation of a dedicated platform that collects, analyzes, and monitors VRE generation in the WAPP area. This VRE platform will allow WAPP to monitor the volume and quality of intermittent—solar—power generation within the different interconnected zones, through the supply of equipment (laptops, tables, chairs, etc.), software and trainings. In addition, the activity will (i) analyze the organizational adjustment of the ICC and WAPP operational coordination centers; (ii) recommend improvements to the Operations Manual and operating procedures for the VRE plants; and (iii) finance the necessary operators' training.
- (b) **Creating a WAPP Renewable Energy Task Force** helps (i) foster technology transfer related to renewable energy based on local and regional industrial development; (ii) engage industry, financial institutions, government officials, and nongovernmental organizations to discuss VRE development in the Region; (iii) improve the level of information exchange between member utilities on existing initiatives to address market barriers; (iv) share knowledge on planning, procuring and integrating solar generation into the grid, (v) identify, pioneer new initiatives, and assess the potential for replicating successful initiatives to



breakdown market barriers; and (vi) encourage the development and use of energy planning tools that include renewable energy. The task force will have four technical sub working groups focusing on (i) VRE grid integration studies and power system modelling; (ii) energy solutions for VRE integration; (iii) VRE challenges for planning, procurement and operation; and (iv) WAPP interconnection for VRE integration. An expert consultant will be hired to support each sub working group and the overall Task Force.

- (c) **Supporting the definition and implementation of a regional grid code**, which will primarily include the definition of a regional high voltage network grid code with VRE requirements, to be proposed to ECOWAS Regional Electricity Regulatory Authority (ERERA) for adoption and will be integrated within WAPP's Operations Manual. This will provide WAPP the opportunity to support its member utilities and regulatory authorities of ECOWAS countries to adapt such a grid code further for a medium voltage network and their national specificities.
- (d) **Capacity building for WAPP and utilities staff with a focus on women.** This is critical for the success of the SOP and smooth deployment of VRE in the region. Professional skills development program needs to be implemented both at the regional level (through the means of SOP #1) and further at national levels (by national utilities under the guidance of WAPP). The capacity-building program, informed by CIGRE's partnership, needs to address the demand for increased interactions between countries' operators and dispatchers and the possible creation of a VRE certification program, for example based on the North American Electric Reliability Corporation model, or another suitable international standard, looking at *inter alia* electrical power systems planning, operation, maintenance and assets management and other areas deemed necessary for the development of technological relevant, technically robust/resilient, economically, environmentally and socially sound power systems. This activity will ensure that particular attention is given to training women and supporting WAPP utilities in recruitment, retention, and promotion of women in the energy sector through dedicated activities discussing, among others, (i) gender stereotypes and norms; (ii) explicit or implicit biases in the workplace; (iii) lack of mentors; (iv) limited networks due to small numbers of women working in the sector; (v) issues maintaining work-life balance and care burden; (vi) gender wage gaps; and (vii) sexual harassment and safety concerns. An analysis will be developed before the development of the capacity-building activities using the work that WAPP is conducting on gender with the United States Agency for International Development and the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) Gender program.
- (e) **Reinforcement of WAPP dedicated staff for the implementation of SOP #1** and capacity strengthening through hiring of staff and consultants.

Component 2: Regional Solar Parks Preparation (US\$13 million equivalent)

3. SOP #1 proposes to support WAPP to

- (a) **Identify and prepare regional solar generation projects and associated grid investments**, in close coordination with WAPP members, IFC, MIGA, and development partners. Such



projects could include the Burkina Faso Regional Solar Project, hydro-connected solar plants, and/or the Mali Regional Solar Project. Activities will include the full spectrum of preparation activities (grid stability studies, pre-feasibility, feasibility, safeguards, project structuring, implementation arrangements determining ownership structure and operation, and regulatory changes).

- (b) **Roll out a solar resource ground measurement campaign** in 28 to 30 locations across the Region to improve overall knowledge of the solar resource and siting of solar plants, and to reduce uncertainties on the solar resource (and thus lower solar PPA prices). One of the goals is to achieve building the capacity in measurement campaigns by WAPP in host institutions (for example, headquarters of WAPP member utilities, technical universities in WAPP countries, and so on). This activity will be performed in coordination with solar energy-related activities of the West Africa Clean Energy Corridor Initiative and the ECOWAS ECREEE, to which WAPP and ERERA are technical partners.

4. The World Bank team has agreed with WAPP to support the completion of feasibility studies, to be coordinated by WAPP and financed under SOP #1 and has identified a complete package of four critical activities to be developed for each identified project and serve as a template for the typical project preparation supported by the facility:

- (a) **Grid stability studies** to (i) provide a sound timetable for the addition of various planned but unsecured solar projects within the country's network; (ii) define the grid reinforcements that will be necessary for controlled integration of the variable solar energy; and (iii) define the optimal locations in the high voltage grid to inject the electricity production of the Regional Solar Parks.
- (b) **Pre-Feasibility and Feasibility studies** to (i) inform the technical design of the generation, the size of the storage (if needed), and associated grid infrastructure; (ii) define the Regional Solar Park land and its potential acquisition requirements; (iii) evaluate the cost of the generation and the potential for regional electricity trade based on the achievable price of solar generation and comparative prices in neighboring countries, combined with their needs for electricity imports to cover demand; and (iv) develop the institutional and contractual arrangements that will be put in place between the IPP, the utility, and the neighboring countries.
- (c) **Development of safeguards instruments, including ESIA**s following the World Bank guidelines through an ESMP and IFC performance standards.
- (d) **Transaction advice to prepare solar auctions** to be held in countries hosting solar parks for procuring solar capacity IPPs through a competitive process. WAPP will hire a transaction adviser in agreement with the national counterpart. The advice will help structure bankable PPAs and auction preparation to procure generation capacity from private developers and bidding documents for public investments in solar parks and any additional infrastructure aiming to facilitate integration into the grid of solar electricity generation. The transaction adviser will also work on regulatory bottlenecks and provide inputs to improve the country's regulatory framework. Under SOP #1, the role of the transaction adviser will end before the



launch of the auction itself. The subsequent SOPs will support transaction advice for the national authorities to launch the auction, select the auction winner, and support the process until financial close.

Box 1.2. Background: Solar Park Auctions

In the last couple of years, a new type of ‘plug and play’ auction was developed, the solar park concept. Owing to a well-structured process and a better risk allocation, the solar park concept was conducive of the very low prices that were seen recently in places like Dubai and India. A solar park is a concentrated zone of development for solar power projects. The Government identifies, secures, and prepares all the sites up front, obtains the necessary permits before the auction, and prepares the necessary evacuation infrastructure. The Government recovers its investment through a solar park fee and a local community fund can be set up focusing on local development. The key elements of the solar park are to (a) transform capital expenditure items into operating expenses (for example, infrastructure and land); (b) optimize risk allocation by reducing up front development risks and regulatory hurdles; (c) enable economies of scale due to large-scale projects; (d) interest experienced developers due to the large size of projects and well-prepared competitive procurement; (e) ensure better grid network planning; and (f) provide access to lower cost of financing due to a lower risk perception by lenders. By enabling a mix of private and public investments, solar parks allow the public sector fiscal impact to be reduced, while minimizing the cost of electricity to consumers by organizing the project development up front and therefore de-risking the project for investors. It is a model of MFD where the larger share of investment is secured from commercial sources of capital. The World Bank has successfully supported the development of parks in India through the Shared Infrastructure for Solar Parks Project (P154283) currently under implementation.

5. The budgets of Components 1 and 2 are as shown in Table 1.1.

Table 1.1. Budgets for Components 1 and 2

#	Activities	Budget (US\$, millions)
1	Component 1: Regional Solar Integration, Dispatch, and Capacity Building	8.0
1.1	Operationalization of renewable energy monitoring system for ICC (equipment, hardware, licenses, forecasting services, and so on)	1.5
1.2	Establishment of a Renewable Energy Task Force and capacity building	2.0
1.3	Development of a Regional Grid Code	1.0
1.4	Capacity building activities on grid integration and dispatch in partnership with CIGRE	2.0
1.5	Reinforcement of WAPP staff (financing key staff and consultants) to support the design and implementation of SOP #1	1.5
2	Component 2: Regional Solar Parks Preparation	13.0
2.1	Development of grid stability studies	2.0
2.2	Development of pre-feasibility and feasibility studies of Regional Solar Parks and their associated infrastructure	3.0
2.3	Development of safeguards instruments for Regional Solar Parks and their associated infrastructure, and network reinforcements	2.0



2.4	Transaction advisory services for the development of solar auctions	3.0
2.5	Solar resource ground measurement campaign (28–30 sites)	3.0
	TOTAL	21.0

6. The proposed technical assistance activities are in line with the recommendations and observations on VRE integration carried out by the consultant in charge of the WAPP Synchronization Project (see Annex 4 for details). This WAPP project aimed at identifying the necessary actions (networks reinforcements and adaptation of operational rules stated in WAPP's Operations Manual) to be undertaken to allow a synchronized operation of all existing WAPP interconnected countries. The technical assistance activities of Component 1 and the task force will analyze the main operational challenges of VRE integration and recommend (a) a general revision of WAPP's Operations Manual; (b) technical solutions; and (c) policies and market design for a better VRE integration.



ANNEX 2: IMPLEMENTATION ARRANGEMENTS

Western Africa

Solar Development in Sub-Saharan Africa - Phase 1 (Sahel)

Project Institutional and Implementation Arrangements

1. Implementation arrangements for the activities under the WAPP technical assistance component of the proposed SOP #1 will be implemented by the WAPP Secretariat through dedicated staff. The WAPP Secretariat has a full complement of staff who will ensure administrative, fiduciary and procurement management for the resources and procurement of consultants for the activities. A dedicated project coordinator will be responsible for the implementation of the components, ensure active participation of countries' beneficiaries in the preparation and implementation of the studies, and ensure the relevance and local ownership of all outputs. In addition to the project coordinator, an environmental specialist, capacity-building coordinator, procurement, and FM specialist from the WAPP Secretariat will support the project. An expert consultant in VRE and integration will be hired under the SOP, as well as an accountant, a social specialist (part-time consultant), and a dam specialist. The unit's scope of work will include (a) supervision and verification of survey, design, and preparation cost estimates of SOP #1 interventions; (b) verification of design, bill of quantities, and tender documents of SOP #1 activities; (c) preparation of annual work plans for all SOP #1 activities and annual financial requirements; and (d) supervision and reporting on SOP #1 implementation.

2. WAPP will be the key development partner during the entire duration of the SOP. Its role includes:

- (a) Identification, planning, and preparation of regional investments in solar generation and grid integration and strengthening;
- (b) Monitoring and coordination of VRE production, grid integration; and electricity trade within the framework of the regional electricity market; and
- (c) Regional-level capacity building and exchange of best practices to improve integration of solar energy into the electricity supply.

Financial Management and Budgeting Arrangements

3. FM. The dedicated staff will be responsible for the execution and implementation of SOP #1, including management and reporting on the fiduciary aspects: FM, disbursements, audits, and procurement among other related matters.

4. Budgeting arrangements. The WAPP Secretariat is currently using, for the WAPP Integration and Technical Assistance Project (Grant No: H770-3A), a Project Implementation Manual (PIM), including detailed budgeting procedures, accounting procedures, the preparation of annual work plans, and anticorruption principles which will be used for SOP #1. The PIM will be updated before effectiveness to be appropriately tailored for SOP #1. The annual work plans and the budgets will be submitted to the World Bank for 'no objection' not later than November 30 of each year proceeding the year the work plan



should be implemented.

Accounting and Reporting Arrangements

5. Accounting policies and procedures. The PIM details the accounting systems, policies, and administrative and financial procedures which is acceptable to the World Bank. It will be used for the SOP operation.

6. Accounting staff. The WAPP Secretariat should retain staffing resources that are adequate for the level of project operations and activities and are sufficient to maintain accounting records related to project-financed transactions, and to prepare the project's financial reports. One qualified and experienced accountant will be recruited through a competitive process in compliance with the World Bank's Procurement Regulations to reinforce the WAPP FM team and be dedicated to the SOP FM under the supervision of the WAPP Secretariat's Head of Administration and Finance. 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 will be reinforced over the SOP implementation period through the rolling out of a training plan that includes sessions on IDA disbursement procedures and financial reporting arrangements, among others.

7. Accounting information systems software and standards. The accounting software acquired under the WAPP Integration and Technical Assistance Project financing will be used for the SOP. This accounting software has multi-projects, multi-sites, and multi-donor features, and is customized to generate its financial reports. The WAPP Secretariat will use International Public Sector Accounting Standards principles.

Internal and External Audit Arrangements

8. Internal audit. The internal audit arrangement that the WAPP Secretariat is currently using for the WAPP Integration and Technical Assistance Project is acceptable and will be applied to the SOP. The work program of the WAPP Secretariat's Internal Audit Unit will be revised within three months of effectiveness to include the SOP to ensure that the audits are done semiannually 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 semiannual internal audit reports need to be submitted to the World Bank within 45 days after the end of the semiannual period.

9. Audit committee. The WAPP Secretariat Finance Committee will conduct the role of audit committee for SOP #1. This role will need to be reviewed in the updated version of the PIM. The committee's charter will be amended as needed. Audit committees are essential in ensuring that the 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 the management from an administrative perspective.

10. Governance and anticorruption arrangements. To enhance transparency and accountability, the WAPP Secretariat will disclose 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 Financing Agreement will apply.

11. External audit arrangements. The SOP's financial statements and internal control system will be subject to external annual audit by an independent external auditor who will be recruited with terms of reference acceptable to the World Bank. The external auditor will provide 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 controls, which will identify specific deficiencies and areas of weakness in systems and controls and make recommendations to improve them. The management letter will report on instances of noncompliance with the terms of the Financing Agreement. 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 SOP will comply with the disclosure policy of the World Bank of audit reports (for instance, after receipt of all final financial audit reports, making all reports available to the public without delay) and place the information on its official website within one month after the World Bank has accepted the final report.

Funds Flow Arrangements

12. Designated Account. The WAPP Secretariat will open a Designated Account (DA) denominated in U.S. dollars in a commercial bank acceptable to the World Bank. The details of the bank account that is opened and the account signatories should be communicated to the World Bank. The signatories to the DA should be in line with the WAPP Secretariat's Operations Manual and they should be submitted to the World Bank between the signing of the project and its effectiveness. Payments for eligible expenditure can be made from the DA.

13. Disbursement arrangements. 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 SOP #1. Further instructions on the withdrawal of proceeds will be outlined in the Disbursement and Financial Information Letter (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 PIM will be applied. Table 2.1 specifies the categories of eligible expenditures to be financed out of the proceeds of the grant, the amounts under each category, and the percentage of expenditures to be financed for eligible expenditures in each category.



Table 2.1. Categories of Eligible Expenditures

Category	Amount of the Grant Allocated (expressed in SDR)	Percentage of Expenditures to be Financed (inclusive of Taxes)
(1) Goods, non-consulting services, training and Operational Costs under Parts 1 and 2 of the project	2,100,000	100
(2) Consulting services:		
(a) under Parts 1, 2 (a)(iv) and 2 (b) of the Project	4,900,000	100
(b) under Part 2 (a)(i) of the Project	1,400,000	
(c) under Parts 2 (a)(ii) and (iii) of the Project	2,800,000	
(3) Refund of Preparation Advance	3,500,000	Amount payable pursuant to Section 2.07 (a) of the General Conditions
Total Amount	14,700,000	

14. Financial reporting arrangements. The WAPP Secretariat will prepare semiannual unaudited interim financial reports (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 reporting period. The formats and contents of the IFR were agreed during negotiations. The quarterly IFRs will include the following information: (a) statement of sources and uses of funds; (b) statement of uses of funds by project activity/component; and (c) DA activity statement and explanation notes to the IFR.

Financial Management Action Plan

15. The WAPP will ensure the implementation of the action plan as shown in Table 2.2.

Table 2.2. Implementation of Action Plan

Issue	Remedial Action Recommended	Responsible Entity	Completion	Effectiveness Conditions
Staffing	Recruit one qualified and experienced procurement specialist and one accountant	WAPP Secretariat	Three months after effectiveness	N
Information system accounting software	Upgrade the existing accounting software version acquired under the WAPP Integration and Technical Assistance Project financing to reflect SOP #1 specificities	WAPP Secretariat	Three months after effectiveness	N
Financial reporting: IFR	Format, content, and frequency of the IFR were discussed and approved during project negotiation	WAPP Secretariat	Completed	N
Internal audit	Revise the work program of the WAPP Secretariat's Internal Audit Unit to include SOP #1.	WAPP Secretariat	Three months after effectiveness	N
External financial	Appoint an external auditor	WAPP Secretariat	Six months	N



auditing	acceptable to IDA		after effectiveness	
Governance and anticorruption	Put the project's budget and audited financial statements on the WAPP Secretariat's website each year	WAPP Secretariat	During the project implementation	N

16. Financial covenants. Financial covenants are the standard ones as stated in the DFIL regarding FM, financial reports, and audits, and which elaborate on the provisions of Section 4.09 of the General Conditions.

17. Implementation support plan. FM implementation support missions will be carried out 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 where deemed necessary. The FM implementation support will be an integrated part of the project's implementation reviews.

18. Conclusion. The conclusion of the assessment is that the FM arrangements in place meet the World Bank's (IDA's) minimum requirements under the World Bank Policy and Directive for Investment Project Financing and are therefore adequate to provide, with reasonable assurance, accurate and timely information on the status of the project required by the World Bank (IDA). The overall FM risk is Moderate.

Procurement

19. Institutional arrangements for procurement. Procurement will be carried out by the WAPP which has already conducted procurement activities for World Bank projects (WAPP Integration and Technical Assistance Project) in a moderately satisfactory manner. Procurement activities shall be carried out using the existing procurement capacity within the WAPP staffed with a senior procurement specialist. The senior procurement specialist joined the WAPP Secretariat in July 2017, and is serving the organization for one year with a possible extension of his contract for another year. The recruitment of the permanent procurement specialist in the WAPP Secretariat is ongoing and expected to be finalized in June 2018.

20. Filing and record keeping. The procurement procedures manual will set out detailed procedures for maintaining and providing readily available access to project procurement records, in compliance with the Financing Agreement. WAPP will assign one person responsible for maintaining the records. The logbook of the contracts with a unique numbering system shall be maintained. The signed contracts as in the logbook shall be reflected in the commitment control system of the WAPP's accounting system or books of accounts as commitments whose payments should be updated with reference made to the payment voucher. This will put in place a complete record system, whereby the contracts and related payments can be corroborated.

21. PPSD. As part of the preparation of the project, WAPP (with support from the World Bank) prepared the PPSD which describes how fit-for-purpose procurement activities will support project operations for the achievement of PDOs and deliver VfM. The activities require strong technical capability to prepare proper technical specifications to avert lack of, or inadequate, market response. This capability, or a plan to enhance it, is considered in the strategy. WAPP shall prepare and submit, to the World Bank,



a General Procurement Notice (GPN) and the World Bank will arrange for publication of the GPN in United Nations Development Business (UNDB) online, on the WAPP website, and on the World Bank's external website. WAPP may also publish it in at least one national newspaper. WAPP shall publish the Specific Procurement Notices (SPN) for all goods, works, non-consulting services, and the Requests for Expressions of Interest on their free-access websites, if available, and in at least one newspaper of national circulation and in the official gazette. For open international procurement selection of consultants using an international short list, WAPP shall also publish the SPN in UNDB online and, if possible, in an international newspaper of wide circulation. The World Bank arranges for the simultaneous publication of the SPN on its external website.

22. Procurement Plan and manual. WAPP has prepared a detailed 18-month Procurement Plan which has been agreed by the World Bank during negotiations. The Procurement Plan will be updated in agreement with the World Bank team annually or as required to reflect the actual project implementation needs and improvements in institutional capacity. Procurement arrangements, roles and responsibilities, methods, and requirements for carrying out procurement shall be updated, in detail, in the procurement manual which may be a section of the Operations Manual. The PIM shall be updated by WAPP and agreed with the World Bank before effectiveness.

23. Procurement methods. The WAPP will use the procurement methods and market approach in accordance with the Procurement Regulations. The procurement procedure to be followed under the project for the Open National Market for Goods, Works, and Non-Consulting Services shall be Local and Regional Competitive Bidding as described in the WAPP Tender Code dated September 2011, and may be used to procure goods, works, or non-consultant services, provided it meets the requirements of paragraphs 5.3 to 5.6 of the Procurement Regulations.

24. Training, workshops, study tours, and conferences. Training activities will comprise workshops and training, based on individual needs, as well as group requirements, on-the-job training, and hiring consultants for developing training materials and conducting training. Selection of consultants for training services follows the requirements for selection of consultants described earlier. All training and workshop activities (other than consulting services) will be carried out on the basis of approved annual work plans/training plans that will identify the general framework of training activities for the year, including (a) the type of training or workshop; (b) the personnel to be trained; (c) the institutions which will conduct the training and reason for selection of this particular institution; (d) the justification for the training, how it will lead to effective performance and implementation of the project and or sector; (e) the duration of the proposed training; and (f) the cost estimate of the training. Reports by the trainee(s), including completion certificate/diploma upon completion of training, shall be provided to the project coordinator and will be kept as part of the records and will be shared with the World Bank if required.

25. Operational costs. Operational costs financed by SOP #1 will finance the reasonable and necessary incremental expenses under Part 1 (e) (Reinforcement of WAPP dedicated staff for the implementation of the project), and comprises expenditures for transport and accommodation, per diem for the staff of the WAPP and the member utilities that have been approved by the World Bank, supervision costs, and salaries of locally contracted support staff. Such services' needs will be procured using the procurement procedures specified in the Operations Manual accepted and approved by the World Bank.



26. The thresholds for particular market approaches and procurement methods are indicated in Table 2.3.

Table 2.3. Thresholds for Procurement Methods and Prior Review ^a

No	Expenditure Category	Contract (C) Value Threshold* [equivalent US\$]	Procurement Method	Contracts Subject to Prior Review / [equivalent US\$]
1	Works	$C \geq 10,000,000$	Open Competition International Market Approach and Direct Contracting	$\geq 10,000,000$
		$200,000 < C < 10,000,000$	Open Competition National Market Approach	None
		$C \leq 200,000$	Request for Quotation	None
2	Goods, IT and non-consulting services	$C \geq 1,000,000$	Open Competition International Market Approach and Direct Contracting	$\geq 2,000,000$
		$100,000 < C < 1,000,000$	Open Competition National Market Approach	None
		$C \leq 100,000$	Request for Quotation	None
3	National short list for selection of consultant firms	$C < 100,000$	For consulting services	None
		$C \leq 300,000$	For engineering and construction supervision	None
4	International short list for selection of consultant firms	$C \geq 100,000$	For consulting services	$\geq 1,000,000$
		$C > 300,00$	For engineering and construction supervision	$\geq 1,000,000$
5	Selection of individual consultants	All Values	All approaches	$\geq 300,000$
6	Direct contracting	All Values		As agreed in the Procurement Plan
7	Training, workshops, study tours	All Values	Based on approved annual work plans and budgets	Annual work plans and budgets

Note: a. The thresholds in the table are for the purposes of the initial procurement plan for the first 18 months. The thresholds will be revised periodically based on reassessment of risks. All contracts not subject to prior review will be post-reviewed.

27. Procurement risk rating. The project procurement risk before the mitigation measures is Substantial. The risk can be reduced to a residual rating of Moderate upon consideration of successful implementation of the mitigation measures. The risks and mitigation measures are provided in Table 2.4.



Table 2.4. Risks and Mitigation Measures

Procurement Risk	Mitigation Measure	Responsibility and Deadline	Risk level Initial/Residual
WAPP Secretariat			Substantial/Moderate
Workload in procurement activities	Recruit a procurement specialist to be dedicated to this project	WAPP Secretariat Within 3 months after effectiveness of the Financing Agreement	
The procurement procedures of the current project will be reflected in the existing PIM	Amend the existing PIM to introduce procurement arrangements planned for this project	Effectiveness Condition	
Weak WAPP capacity in New Procurement Framework procedures	Capacity building will be provided by the World Bank on New Procurement Framework procurement.	WAPP and World Bank During project implementation	

Monitoring and Evaluation

28. WAPP's dedicated staff will include M&E staff/consultants. The World Bank team will support the M&E process.

**ANNEX 3: IMPLEMENTATION SUPPORT PLAN****Western Africa****Solar Development in Sub-Saharan Africa - Phase 1 (Sahel)****Strategy and Approach for Implementation Support**

1. Implementation is expected to begin in 2018, following World Bank approval expected by June 2018. The implementation support will begin as early as possible to prepare WAPP ahead of the first disbursement. The World Bank team members for procurement, FM, and safeguards based in Benin will ensure timely support to the Client. Formal supervision and field visits will be carried out at least twice a year.

Financial Management and Procurement

2. FM and procurement implementation support missions will be carried out once a year based on the Moderate FM and procurement 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 where deemed necessary. The FM and procurement implementation support will be an integrated part of the project's implementation reviews.

Implementation Support Plan and Resource Requirements

3. Table 3.1 details the Implementation Support Plan and World Bank resourcing requirement.

Table 3.1. Implementation Support Plan

Time	Focus	Skills Needed	Resource Estimate
First twelve months	Consultants' mobilization and supervision for activities under Components 1 and 2	Energy specialists, safeguards Experts	US\$100,000
12-48 months	Supervision of capacity building-activities and preparation of solar parks' investments	Energy specialists, safeguards Experts, legal experts, transaction advisers	US\$600,000

Table 3.2. Resource Requirement

Skills Needed	Number of Staff Weeks	Number of Trips
Overall supervision		
Task team leader	15	10
Co-task team leader	25	10
Operations adviser	8	5
Energy experts	50	10
FM	4	4
Procurement	4	4
Environmental safeguards	4	4
Social safeguards	4	4
Gender expert	3	2



ANNEX 4: WAPP Projects and World Bank Support

Western Africa

Solar Development in Sub-Saharan Africa - Phase 1 (Sahel)

1. The World Bank has developed a strong partnership with WAPP and, together with other donors, is financing parts of all five WAPP Master Plan Investment subprograms, (a) coastal transmission backbone; (b) interzonal transmission hub; (c) OMVG and OMVS power system development; (d) North-core transmission; and (e) CLSG power system redevelopment. Moreover, WAPP supports the preparation of key generation projects for cost efficient electricity in the Region and assists member countries in building commercial and technical instruments to create an energy market. To channel this support, the World Bank uses three main instruments: (a) investment project financing; (b) technical assistance; and (c) guarantees. The World Bank has financed the construction of regional transmission infrastructure through IDA/IBRD credits and provided IDA credits for regional renewable energy generation, mainly large hydro projects. It first financed a WAPP project in June 30, 2005, when the World Bank Board endorsed an Adaptable Program Loan (APL) as the main vehicle for providing IDA support to WAPP, within the framework of the World Bank's Regional Integration Assistance Strategy for West Africa. At that time, the World Bank dedicated US\$350 million in IDA resources under the IDA Regional Pilot Program for a multiyear, programmatic framework to support WAPP priority investments and technical assistance activities under the Revised WAPP Master Plan. The APL framework allowed for the reinforcement of policies through policy triggers, such as country commitments and ratification of the ECOWAS Energy Protocol.

2. The World Bank's rationale for supporting the regional integration agenda as a major tool to expand access to affordable and reliable electricity in West Africa is grounded in (a) the need for regional transmission infrastructure because cost-effective generation, such as hydropower, is often far from markets; (b) the fact that a regional power system allows countries to overcome inefficiencies related to their small economies, enabling development of large projects through export of excess production, or import of lower cost electricity from other countries; (c) recognition that a regional approach optimizes the use of resources for electricity supply and reduces overall capital costs of generation, even if energy trade is not fully developed and infrastructure is not fully used in the short term; and (d) the fact that regional interconnectors serve as an important part of the national transmission grid for countries like Liberia and Sierra Leone, where national transmission networks are nascent. Along the lines, access can be provided to communities through the use of low-cost shield wire scheme technology and through grid densification around sub-stations.

3. The ongoing World Bank support to WAPP energy investment program is summarized in Table 4.1.



Table 4.1. World Bank Support to the WAPP Energy Infrastructure Program under Implementation

Project	Countries	World Bank Project	WB Financing (US\$, millions)	Project Cost (US\$, millions)	Date of Commissioning (or expected)
APL1- Coastal Transmission Backbone (P094917)					
Coastal Transmission Backbone	Ghana, Benin	APL1 - Phase 1: Ghana	40 - Ghana.	83	2010
		APL2 - Phase 2: Ghana- Benin	45 - Ghana 15 - Benin World Bank Total: 60	75	2013 (Ghana) Not yet built (Benin)
APL2: OMVG and OMVS Inter-Zonal Transmission Hub (P094916)					
OMVS	Mauritania, Senegal, Mali	OMVS Felou Hydropower APL2 - Phase 1 (Parent (2006) and Additional Financing (2009)	67.5 - Mali 25 - Mauritania 67.5 - Senegal World Bank Total: 160	175	2013
		OMVS reinforcement - APL2 - Phase 3	97 - Senegal	103	2020
OMVG	Senegal, The Gambia Guinea, Guinea Bissau	OMVG Interconnection loop APL2- Phase 2	47 - The Gambia 30 - Guinea 78 - Guinea-Bissau 45 - Senegal. World Bank Total: 200	711	2019
APL3 -Inter-zonal Transmission Hub (P094919)					
Interzonal Transmission Hub	Burkina Faso Mali Ghana	Phase 1: Ghana (Bolgatanga)-Burkina Faso (Ouaga) ^a	16 - Burkina Faso 25.9 - Ghana World Bank Total: 41.9	111	2018
APL4- WAPP-CLSG Power System Redevelopment (P163033)					
WAPP-CLSG Power Interconnection Project	Côte d'Ivoire, Liberia, Sierra Leone, Guinea	CLSG Interconnection Phase 1 (with single circuit)	144.5 - Liberia 31.5 - WAPP	476	2021



4. In addition to ongoing projects, a pipeline of World Bank-financed regional investment projects is in preparation, aiming to foster regional integration and further expand electricity services in the Region. The World Bank is preparing an on-grid access program to connect about 500,000 new customers and benefit about 3 million people, an off-grid regional project using renewable energy (mostly solar) in multiple countries, and a new Guinea-Mali high voltage transmission project from N'Zérékoré, Guinea to Sanankoroba, Mali, including the construction/extension of seven substations and the electrification of nearby communities. The pipeline projects are presented in Table 4.2.

Table 4.2. World Bank Support to Other Regional WAPP Energy Infrastructure - Projects in Pipeline

Project	Countries	Proposed WB Financing (US\$, millions)	Project Cost (US\$, millions)	Expected Date of Commissioning
North Core Regional Interconnection Project (P162933)	Niger Nigeria Benin Burkina Faso	94.4 - Niger 53.3 - Nigeria 23.9 - Benin 147.1 - Burkina Faso Total: 418.6	610	2020
Guinea-Mali Interconnection (P166042)	Guinea-Mali	83.6	404.4	In preparation
Regional Off-Grid Electrification (P160708)	Benin, Burkina Faso, Cameroon, Central Africa Republic, Chad, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Islamic Mauritania, Niger, Nigeria, Senegal, Sierra Leone Togo	200	200	In preparation
On-Grid Regional Electricity Access Project (P164044)	Guinea Guinea Bissau Mali Senegal The Gambia	312	312	Identification stage

5. The World Bank provides technical assistance to WAPP and its members to strengthen the legal and regulatory framework for regional electricity trade, build capacity for trade, address issues that hinder power trade, and scale up trading initiatives. An example is the US\$20 million grant to WAPP under the CLSG Project for capacity building for regional trade, improving the synchronization of national electricity systems, scaling up the use of storage to enhance system reliability and the use of renewable energy, as well as preparing new strategic generation and transmission projects included in the WAPP Master Plan. A WAPP task force has endorsed the recommendations of the technical assistance to facilitate power trade in Sub-Saharan Africa, seeking to identify commercial arrangements to strengthen



payment discipline, develop mechanisms to securitize payments, and eventually incentivize private sector participation at both the regional and transaction levels. The recommendations will then be submitted to WAPP's Executive Committee and eventually to the Ministers of Energy of ECOWAS and Ministers of Finance of ECOWAS. Additionally, the World Bank has initiated technical assistance to support solar generation in West African countries.

6. Finally, the World Bank supports private investment in regional projects through guarantee instruments to back up off-taker payments. The World Bank supported the West Africa Gas Pipeline through a Partial Risk Guarantee to cover the risks faced by investors in the West Africa Pipeline Gas Company, arising from nonpayment by the largest gas purchaser. The World Bank extended IBRD enclave guarantees of up to US\$200 million and an IDA guarantee of up to US\$500 million for the Sankofa Gas Project in Ghana (P152670), which is expected to leverage private sector participation and enable the mobilization of nearly US\$8 billion of foreign direct investment in the country.

The WAPP Market Design Phases and Implementation Road Map

7. The ECOWAS Regional Electricity Authority adopted the WAPP Regional Market Rules in 2015. The rules identify three phases of market development. The first phase concerns the enforcement of the bilateral agreements through a standardized model contract by the regional regulator, which is about to be issued. The second phase envisages bilateral trading with transit through third-party countries based on standard commercial instruments. Short-term exchanges through the day ahead market will be established with optimization of the dispatch model. The regional regulator will regulate transmission prices. The third and the final phase will establish a competitive energy and ancillary services market in WAPP. The availability of regional transmission capacity and generation reserve is required for the regional market.