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Project Information Document/ Integrated Safeguards Data Sheet (PID/ISDS)

Concept Stage | Date Prepared/Updated: 02-Apr-2018 | Report No: PIDISDSC21566

BASIC INFORMATION

A. Basic Project Data

Country	Project ID	Parent Project ID (if any)	Project Name
Western Africa	P162580		Solar Development in Sub-Saharan Africa - Phase 1 (Sahel) (P162580)
Region	**Estimated Appraisal Date**	**Estimated Board Date**	**Practice Area (Lead)**
AFRICA	Apr 17, 2018	Jun 15, 2018	Energy & Extractives
Financing Instrument	**Borrower(s)**	**Implementing Agency**	
Investment Project Financing	West African Power Pool (WAPP)	West African Power Pool (WAPP)	

Proposed Development Objective(s)

The Series of Projects' development objective (PDO) is to facilitate capital mobilization for the deployment of Regional Solar Parks in West Africa.

SOP #1 furthers this objective with project specific PDO to (i) strengthen the regional technical capacity to integrate solar electricity into the grids and (ii) support the preparation of large-scale solar electricity generation.

Financing (in USD Million)

Financing Source	Amount
IDA Grant	25.00
Total Project Cost	**25.00**

Environmental Assessment Category	Concept Review Decision
A-Full Assessment	Track II-The review did authorize the preparation to continue

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Other Decision (as needed)

B. Introduction and Context

Regional Context

1. Regional cooperation is critical to end extreme poverty and boost shared prosperity in the West Africa region including the Sahel[1] (the Broader West Africa Region). The Broader West Africa Region is diverse economically, culturally, and ecologically presenting both opportunities and challenges for regional cooperation. Countries in the Sahel and broader West African region, have moved forward politically and economically towards greater cooperation for the prosperity of the region. In this regard, the first effort at integration dates back 1945 with the creation single currency union that brought together the francophone countries of this region. Later, on May 28, 1975, 15 countries - Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Sierra Leone, Senegal and Togo – came together, via the treaty of Lagos, to promote economic integration across the region by forming the Economic Community of West African States (ECOWAS). Forty years later, ECOWAS is still promoting economic cooperation and regional integration as a tool for an accelerated development of the West African economy as per ECOWAS Vision 2020[2]. Furthermore, Burkina Faso, Mali, Mauritania, Niger and Chad created in 2014 the G5 Sahel to coordinate policies and strategies for development and security.

2. Despite positive prospects, overall growth in the Broader West Africa Region remain low, primarily affected by vulnerabilities to external shocks, economic interdependencies and recent political instability. If recent growth has been significant in some countries such as in Ivory Coast (7.6 percent in 2017), Senegal (6.8 percent in 2017) and Burkina Faso (6.4 percent in 2017), according to the International Monetary Fund (IMF), it has been very low or even negative in other countries of the region. 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, in particularly in the Sahel, aftermath of the Ebola crisis, climate variability and change impacts and, recent economic downturn coupled with inflation in Nigeria directly impacting neighboring economies. Thus, more than 70 percent of the population in the broader West African region, including the Sahel, 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. In terms of human development, with an average development index of 0.46 for West Africa, most of the countries within the zone remain within the category of countries with "low human development." According to the United Nations Development Program's Human Development Report, only Cabo Verde and Ghana are ranked in the category of countries with "average human development".

3. Climate change mitigation and adaptation impacts and costs aggravate the Broader West Africa Region's many development challenges. Although this region is only responsible for a fraction of global energy related Green House Gas (GHG) emissions, it will be highly impacted by adaptation costs of climate change in the forthcoming decades. Thus, these challenges in turn considerably complicate the implementation of regional strategies aimed at fostering socio-economic development, attracting foreign investment programs, providing basic social services, and achieving the Sustainable Development Goals (SDGs) in general and, in particular, SDG 7 aiming to ensure access to affordable, reliable, sustainable and modern energy for all.

[1] The broader West Africa region encompasses 15 countries: Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Sierra Leone, Senegal and Togo

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

Sectoral and Institutional Context

4. About one third of the population in Broader West Africa Region has access to electricity, representing more than 245 million people without access, with large disparities between countries and rural-urban areas. The West Africa Region has an average rate of access of 34 percent while the Sub-Saharan Africa (SSA) as a whole has an average access rate of 38 percent. Moreover, large disparities can be observed in the electrification rates within the Region itself, from 6 percent in Chad and 18 percent in Burkina Faso to 71 percent in Cape Verde. Significant disparities exist also between rural and urban populations such as 58 percent in urban areas and 3 percent in rural areas in Burkina Faso. Overall, lack of access to electricity affects more than 245 million people in Western African countries and in the Sahel. Two countries, Nigeria and Niger, concentrate half of the population lacking access to electricity in the region.

5. Energy is considered a key factor in achieving sustainable development and poverty reduction yet the status of energy systems in the Broader West Africa Region hampers its social, economic and industrial development. Most client governments, donor governments and international organizations have recognized the importance of integrating energy into development policies to promote sustainable development**.** Countries face interrelated challenges of energy access, energy security and climate change simultaneously. Electricity shortages in urban areas and lack of access to modern, affordable and reliable energy services in rural areas are interrelated with a variety of economic, social, environmental and political problems. The electricity systems in the Region face challenges due to the growing gap between demand, existing supply and limited capital to invest. In addition, the SSA current average cost of supply is high, often above US$ 0.20 per kWh, mainly because of the high dependency on fossil fuels for primary energy such as heavy fuel oil and diesel and the need to import such fuels over long distances in landlocked Sahel countries. Given recent evolution in solar prices, large-scale solar plants could become critical in reduction of the Region's dependence on fossil fuels, and bring a shift towards cleaner and less expensive source of electricity. This shift is also expected to promote energy security in the region, while also providing climate change co-benefits. There is political momentum and a broad recognition at the regional level of the potential benefits in mobilizing solar energy to diversify electricity supply further, along with older and ongoing efforts to expand the two other main sources of primary energy: natural gas and hydropower.

6. As the electricity provided in the Region is overall of quite poor quality, expensive, and delivered unreliably, substantial investments in more affordable and sustainable electricity generation are required. In 2017, The West Africa Region's total electricity generation installed capacity was 18 GW, excluding Nigeria (4 GW of available capacity). Excluding Nigeria, West African electricity systems are small, ranging from 96 MW for Chad to slightly more than 1 GW in Ivory Coast and Ghana. The West Africa Region has an average yearly consumption per capita of 188 kWh while the North and the South Africa Regions have an average yearly consumption per capita of around 1,500 kWh and 2,000 kWh, respectively. Most of the installed capacity in the Region is diesel, HFO and hydropower, with some larger countries having access to gas. However, with the prices of solar falling in the last couple of years, most countries in the Region, such as Burkina Faso and Mali, are reviewing their generation plan to include more solar photovoltaic (PV) power plants. Indeed, observed prices for solar PV generation Power Purchase Agreement (PPA) contracts obtained recently through auctions in several developing countries are comprised between USc 5-10 per kWh[3] but this has not yet been the case in West Africa. Additionally, it should be noted that there are very few data points from fragile and conflict states. As the trend of decreasing solar PV prices is expected to continue, and West Africa Region has a possibility to benefit from this market development to increase its power generation using local and increasingly affordable power source, solar energy.

7. Various countries in the Broader West Africa Region are already working with development partners to materialize their important solar potential by planning and financing grid-connected solar PV generation projects,

whether through competitive procurement processes or negotiated bilateral contracts. Solar energy, and particularly solar PV, is a competitive option to meet daytime energy demand and to provide electricity access to users connected to large or small and isolated grids. In addition, technological advances in electricity storage are increasing its cost-competitiveness to meet peak demand, which occurs in West African countries in the evening, while providing grid stability services. Additionally, Concentrated Solar Power (CSP) is another solar electricity generation technology that offers the potential benefit of thermal storage to meet night time peak electricity demand. Assessing the feasibility of both CSP and PV will be an integral part of this SOP.

8. The installed capacity of solar PV in the region (excluding Nigeria) at the end of 2017 was at about 150 MW, representing around 1 percent of the total installed electricity generation capacity, reflecting structural and technical constraints such as weak planning capacity and grid integration challenges, including very weak dispatch. A handful of countries, Burkina Faso, Nigeria, Mauritania and Senegal mainly, concentrate majority of the existing solar PV installed capacity. Utility scale solar electricity generation projects is currently largely made of small PV plants of up to 30MW size, too small to benefit from economies of scale. The two common key structural and technical constraints preventing a sustained and more ambitious uptake are:

(i) **Grid integration challenges.** In West Africa due to the small size of individual national power systems, the lack of spinning reserve and reactive power, outdated operation of networks, and the absence of automation in dispatch and adequate grid codes, the integration of variable renewable energy (VRE) is challenging from early stages, even when reaching a penetration level of 5 to 10 percent, which is easily manageable in larger systems with automated dispatch. With 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. The other consideration is that the regional grid is undergoing an important change, with more than 4000 km of line under construction. Starting with a disjoined transmission system, the ongoing interconnection projects already funded and under implementation will ensure that all Economic Community of West African States (ECOWAS) countries (except Cabo Verde) are interconnected by 2021 and the regional system will be sufficient to meet the medium-term regional transmission needs.

(ii) **Weak planning capacity.** Most utilities in the West Africa Region have nascent planning capacities that are required to develop a least-cost generation plan to organize and contract the future generation required in the medium to long-term. Due to lack of planning, solar deployment in the Region has been mainly through unsolicited proposals that are usually more expensive than contracts resulting from an organized process such as competitive bidding. Ultimately, solar generation procurement in the West African Region for the time being tends to be a slow and protracted process that penalizes ability to materialize the full economic benefits of solar deployment.

9. Following the vision that energy resources available in the West Africa Region can be exploited for the mutual benefit of all countries, the West African Electric Power Exchange System (WAPP) was created at the ECOWAS Conference of Heads of State and Government in 1999. Covering 14 of the 15 countries of the regional economic

[3] World Bank, 2017, What Drives the Price of Solar Photovoltaic Electricity in Developing Countries?, LiveWire 72.

community[4], 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 also facilitates the identification and preparation (up to and including feasibility studies) of power generation facilities connected to the high voltage regional network and cross-border transmission lines, as per agreed beforehand by utilities and member states as part of the elaboration of the WAPP Business Plan and Master Plan. Finally, WAPP has mandate on 'soft' transversal issues, notably on specific capacity building activities relevant to all of its members. 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 Electric Power Generation Facilities (the Master Plan). The Master Plan approved by the Heads of State forms the basis for the development of regional projects in the region. Officially endorsed by ECOWAS's Heads of Member States, the WAPP Master Plan informs the investment listed in the WAPP Business Plan. Once approved, WAPP has the full authority to deploy funds towards the implementation of projects preparation, like feasibility and environmental and social studies, and the related capacity building activities. 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 MWp regional solar projects in Burkina Faso and Mali. Given the new price dynamics for solar PV, additional solar projects are expected to be identified in the 2018 Master Plan update.

10. WAPP has a mandate to plan electricity infrastructure expected to help with regional integration of electricity markets, and to develop regional power trade, but it has limited experience with solar electricity. WAPP has a long-standing experience with regional planning and project preparation, in particular for regional transmission line and regional hydropower plants. However, it has very limited experience in preparation of solar projects and participation of the private sector in regional projects. Its capacities in these respects clearly needs to be increased through a multifaceted technical assistance package. Additionally, the WAPP Information and Coordination Center, currently under construction in Calavi in Benin, will serve as the central monitoring and electricity trading accounting hub of the WAPP region. The center will enable to effectively monitor electricity production and transmission cross-border exchange and therefore enhance a reliable and secure operation of WAPP's future interconnected power system. Being able to effectively monitor renewable energy forecast and production data and other relevant information across countries connected to WAPP network will be key to smooth operation of the entire interconnected system, in particular as the expansion of solar PV in the region's electricity systems starts to increase significantly.

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

Higher Level Objectives to which the Project Contributes

11. The Series of Project (SOP) supports the World Bank's twin goals of poverty reduction and shared prosperity while being consistent with the ECOWAS objectives on power generation and grid expansion. Many of the West African countries Country Partnership Frameworks (CPF) 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 regards 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. With the aim of augmenting investments in the energy sector and developing electricity trade ECOWAS formulated the ECOWAS Energy Protocol, a legal framework for long-term cooperation among its Member States, based on complementarity and mutual benefit. Incidentally, all Sahel G5 countries have ongoing efforts to assess the feasibility of solar electricity generation expansion in their electricity mix. Pursuing those efforts will benefit from more systematic oversight at the regional level.

12. The SOP responds directly to the ambitious targets of the Africa Climate Business Plan (ACBP) of the World Bank Group launched at Conference of Parties (COP) 21 held in Paris in 2015. ACBP includes a target to deliver 1 GW of grid-connected solar and for 5 million households to gain access to modern energy services via off-grid solar by 2023 (funds raised by 2020) for Sub-Saharan Africa. Since then, the Africa Region has requested that the World Bank and the IFC focus on the Sahel and prepare a plan on how the World Bank Group (WBG) can help scale up solar energy in the countries of the Sahel, namely Burkina Faso, Chad, Mali, Mauritania, Niger, and Senegal. 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 region of West Africa including Sahel. Ultimately, the goal is satisfying the energy needs of the poor with sustainable and affordable electricity and developing integrated, efficient and reliable power systems. The SOP is also fully in line with both the World Bank's Energy Sector Direction Paper (2013) that encourages investments in renewable energy sources and the Sustainable Development Goals (2015), which include in SDG 7 provisions towards 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.

13. The SOP is also aligned with support the WBG objectives to maximize impact of public financing by leveraging where possible private sector investments. In March 2017, WBG presented the Forward Look and introduced the "Maximizing Financing for Development Approach" as a concept to guide the WBG's efforts to leverage the private sector for growth and sustainable development and focus the Governments effort on public goods. The SOP is designed to leverage the private sector 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 whilst simultaneously leading to improved services to households and consumers.

C. Proposed Development Objective(s)

14. The Series of Projects' development objective (PDO) is to accelerate the diversification of the energy mix towards least-cost grid-connected solar electricity generation in West African countries.

15. SOP #1 furthers this objective with project specific PDO to (i) streghthen the technical regional capacity for solar integration and (ii) support the preparation of large-scale solar projects in the region.

Key Results

16. The SOP #1 key results indicators may include:

(i) Analytic studies to facilitate operational solar projects completed (MW of solar generation capacity identified)
(ii) Technical regulations revised/drafted/modified (e.g.: evidence of regulatory change)
(iii) Capacity building interventions (e.g.: number of trainings)

D. Concept Description

1. Description of the proposed project:

17. The proposed first project (SOP #1) consists in technical assistance (TA) support to be implemented at the regional level by the WAPP secretariat in collaboration with the utilities and authorities of the recipient countries. It will consist of a regional IDA grant of US$ 25 million towards the identification and preparation of regional investments in solar electricity generation, grid infrastructure, dispatch and storage, along with capacity building support with particular focus on planning, regulations, technical knowledge and resource assessment and validation.

18. Component 1: Solar generation expansion and grid integration capacity development (US$ 7 million). The SOP #1 proposes to support WAPP's member utilities to strengthen their grid integration capacity to and expand WAPP solar energy production monitoring capabilities by:

(i) Reinforcing the Information and Control Center[5] with a post dedicated to variable renewable energy to allow WAPP to monitor the volume and quality of intermittent – solar – power generation within the different interconnected zones.
(ii) Creating a WAPP Renewable Energy Task Force, to (i) follow and support the development of variable renewable energy projects across WAPP countries; (ii) support an increased coordination and knowledge on variable renewable energy issues between WAPP countries and their respective utilities; and (iii) share knowledge on planning, procuring and integrating solar generation into the grid.
(iii) Supporting the definition and implementation of regional and national grid codes with VRE connection requirements.
(iv) Capacity building and technical assistance activities to support the design and implementation of the SOP.

19. Component 2: Identification and preparation of regional investments in solar electricity generation and associated network reinforcements and upgrading (US$ 18 million). The SOP #1 proposes to support WAPP's Planning, Investment Programming & Environmental Safeguards Department to:

(i) 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, the Mali Regional Solar Project, solar generation facilities tied to hydropower plants. Activities would include the full spectrum of preparation activities (pre-feasibility,

[5] The control center, supplied by GE Alstom, supervised by EDF and funded by EU, has begun construction and is expected to be commissioned at the end of 2019.

feasibility, safeguards, project structuring, implementation arrangements determining ownership structure and operation, regulatory changes). Inclusion of countries not members of WAPP (Mauritania, Chad) will be done on an ad hoc basis.

(ii) Roll out a solar resource ground measurement campaign in multiple locations across the region to improve overall knowledge of the solar resource, siting of solar plants, reduce uncertainties on the solar resource (and thus lower solar electricity production prices).

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SAFEGUARDS

A. Project location and salient physical characteristics relevant to the safeguard analysis (if known)

The future locations of the project under the subsequent SOPs are still unknown at this point. These will be determined during project implementation as well as the salient physical characteristics relevant to safeguards.

B. Borrower's Institutional Capacity for Safeguard Policies

The WAPP is familiar with the WBG's safeguards requirements, but there is a need to ensure and enhance capacity at national levels in relation to environmental and social safeguards. The ESIA will also assess the needs of capacity building at national levels in the utilities for safeguards issues.

C. Environmental and Social Safeguards Specialists on the Team

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D. Policies that might apply

Safeguard Policies	Triggered?	Explanation (Optional)
Environmental Assessment OP/BP 4.01	Yes	Environmental Assessment OP/BP 4.01 is triggered, as the SOP#1 is a Technical Assistance project that will support preparation of pre-feasibility as well as feasibility studies, capacity building and legal and regulatory reviews in the WAPP's Energy Sector. No physical investments or activities will take place anywhere in the participating countries during project implementation. Since SOP#1 entails to finance the studies mentioned above, a generic ToR for ESIAs will

		be prepared and cleared by the Bank prior to appraisal. The ToR for ESIA will be customized and used in relation to identified potential impacts and mitigation measures for the solar infrastructure in each specific country, per the pre-feasibility and the feasibility studies in the identified sites, during SOP #1 implementation.
Natural Habitats OP/BP 4.04	No	Since the Project will not involve subprojects pertaining to construction investments or activities that may affect critical habitats (mangroves, wetlands, protected areas, etc.) the OP 4.04 of Natural Habitats is not triggered.
Forests OP/BP 4.36	No	The Project will not finance subprojects with activities dealing with deforestation or afforestation during implementation, thus the OP 4.36 on Forest is not triggered.
Pest Management OP 4.09	No	The project will not finance the procurement and/or use of pesticides
Physical Cultural Resources OP/BP 4.11	No	The project is not anticipating affecting physical cultural properties as construction/rehabilitation of infrastructure, thus unlikely to affect physical cultural resources. Therefore, OP/BP 4.11 is not triggered.
Indigenous Peoples OP/BP 4.10	No	There are no indigenous people in the countries of the ECOWAS sub-region.
Involuntary Resettlement OP/BP 4.12	Yes	The SOP # 1 is Technical Assistance (TA), and will not finance civil works. It will, however, finance the preparation of pre-feasibility and design studies, as well as feasibility studies and therefore ToRs for an ESIA will be prepared and cleared by the Bank prior to appraisal. These ToRs will be will be used in relation to identifying potential impacts and mitigation measures for each of the solar infrastructure to be examined during SOP #1.
Safety of Dams OP/BP 4.37	No	The implementation of the SOP#1 will not entail neither the construction of a new dam nor be dependent on the performance of an existing dam. Therefore, OP/BP 4.37 is not triggered.
Projects on International Waterways OP/BP 7.50	No	The implementation of the SOP#1 will not involve extraction of water from any international waterways (river, canal, lake or any water body that flows through two or more states) or tributaries of surface water bodies. OP/BP 7.50 is not triggered.
Projects in Disputed Areas OP/BP 7.60	No	The project will not be located in disputed area in any of the beneficiary countries.

E. Safeguard Preparation Plan

Tentative target date for preparing the Appraisal Stage PID/ISDS

Apr 02, 2018

Time frame for launching and completing the safeguard-related studies that may be needed. The specific studies and their timing should be specified in the Appraisal Stage PID/ISDS

Terms of Reference for an Environmental and Social Impact Assessment (ESIA) will be prepared by the WAPP and cleared by the Bank prior to appraisal.

CONTACT POINT

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APPROVAL

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