



Appraisal Environmental and Social Review Summary

Appraisal Stage

(ESRS Appraisal Stage)

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BASIC INFORMATION

A. Basic Project Data

Country	Region	Project ID	Parent Project ID (if any)
South Sudan	EASTERN AND SOUTHERN AFRICA	P178891	
Project Name	South Sudan Energy Sector Access and Institutional Strengthening Project		
Practice Area (Lead)	Financing Instrument	Estimated Appraisal Date	Estimated Board Date
Energy & Extractives	Investment Project Financing	3/13/2023	5/1/2023
Borrower(s)	Implementing Agency(ies)		
The Republic of South Sudan	Ministry of Energy and Dams		

Proposed Development Objective

To increase access to electricity services and strengthen the institutional capacity of the electricity sector in South Sudan.

Financing (in USD Million)	Amount
Total Project Cost	53.00

B. Is the project being prepared in a Situation of Urgent Need of Assistance or Capacity Constraints, as per Bank IPF Policy, para. 12?

No

C. Summary Description of Proposed Project [including overview of Country, Sectoral & Institutional Contexts and Relationship to CPF]

The design of the project is based on ongoing advisory services and analytics (ASA) work – “Pathways to Electricity Access Expansion in South Sudan” (P175227), which was initiated in October 2020 with support from Energy Sector Management Assistance Program (ESMAP). The analytical assessment includes a comprehensive diagnostic of the electricity sector in South Sudan and identification of key opportunities and barriers to electricity access expansion as well as a geospatial and market analysis of mini-grid and off-grid solutions. This project relies on data gathered and the analysis conducted through the ongoing ASA to outline potential areas for financing support as well as capacity building and technical assistance.



The project is structured with four components; the first three components are investment component to enhance access to electricity services through isolated grids and off-grid interventions. The fourth component is intended to strengthen the sector’s institutional capacity as well as the overall project implementation capacity. Given the very nascent nature of the sector and lack of experience in implementing Bank-financed project, the role of the capacity building component is foundational to the achievement of the PDO. The investment components are designed to build on previous/existing investment in the country in the energy sector in order to maximize and minimize the risk of the capacity gap.

Component 1. Grid densification and extension in Juba (\$20M)

This component will finance additional grid connections to residential, commercial, and industrial customers in Juba and its vicinity through (i) service drop connections for new connection requests in the middle of the network and making use of the existing distribution infrastructure including 24 non-connected transformers already erected across the city (up to 20,000 connections) and (ii) expanding the MV and LV networks to the North, West and Southeastern parts of the city for additional 20,000 connections. These additional connections are expected to more than double the number of connections. The exact target areas for densification and expansion are identified by the government through JEDCO and could also include communities in the periphery of Juba, such as Nesitu, Lokiliri, and Rajab based on the availability of funds. The component intervention will cover new connections within various site locations of Juba. The investment may also include installation of capacitor banks to strengthen the backbone system and the integration of solar-based electricity expected to be available in the near future.

- Existing electrified area (border color blue)- estimated number of new connections- 10 000
- Existing 24 transformer area (border color magenta)- estimated number of new connections- 10 000
- Newly electrified area (border color cyan)- estimated number of new connections- 13000 electrified; Streetlights 5,500.
- Large bulk supply customers (dispersed locations)

The intervention will also include streetlights along the distribution poles to improve the security in Juba. Assuming one streetlight per six customers, 11000 lights are expected to be installed. Lack of lighting at night in Juba is considered as one of the contribution factors to insecurity in the city, resulting in the incidents such as murder, robbery, raping and other criminal incidents. It also affects the hours that the businesses can practically operate in the city. Such intervention was a part of earlier intervention by AfDB, but many of the lights are currently not functional due to technical failures of the lamps as well as vandalism. Under the project, the intervention will use high-efficiency light-emission diode (LED) lamps to ensure the longevity of the lights and minimize the replacement needs, as well as measures to mitigate the risk of vandalism, and potentially restore existing non-functioning lights. MoED will sign a new agreement of amend existing agreement with JEDCO for the maintenance of the streetlights.

To implement the component, MoED will competitively procure an EPC contractor to carry out the investment. The MoED will also engage an engineering firm as the Owner’s Engineer to review the existing technical materials, and support the procurement and contract management of the EPC contractor, including the support for the preparation of bidding documents, evaluation of bids, contract negotiation and supervision of the contractor. The same Owner’s Engineer will provide similar support to the implementation.

The project builds on a feasibility study supported by preceding intervention by the African Development Bank. The project activities will build up on the distribution network constructed to cover about 35% of the city with support by



the AfDB (Phase I). The grant financing for this project is expected to lower the current high service connection cost to consumers. The client supported by JEDCO, the distribution company formed as PPP, worked with the Bank's team to define the scope of work and areas from perspectives of demand growth & utility's waiting lists and based on route selection and cost estimates of the feasibility study.

Investments under this component is expected to enable the integration of additional solar PV generation and reduce the cost of electricity service in Juba. Increasing connections will ensure efficient utilization of current and planned generation facilities around Juba. By expanding the MV and LV networks, the grid's capacity will be enhanced to cater for power to be supplied from forthcoming generation assets, including the two 20 MW solar PV plants (Nesitu and Ezra) currently under construction. Twenty-five percent (25%) of the budget is allocated towards optimizing the backbone network for this purpose.

The intervention will fully subsidize the connection fee. Currently, new customers are expected to pay minimum connection fees of 300 US\$ (single phase meters) and reach up to 600US\$ (three phase meters) which is high and unaffordable. Moreover, the sector doesn't have a procedure for a uniform connection fee by end-users. During the AfDB-funded project, users received connections for free. Afterwards, new customers have been paying the total connection cost estimated by JEDCO. The project will also eliminate the currently high service connection cost to JEDCO consumers.

The additional grid infrastructure will be operated and maintained by JEDCO. Given JEDCO is currently operating the Juba grid under a public-private partnership with MoED and SSEC, JEDCO will also operate the new infrastructure added to the grid. JEDCO will use pre-paid meters to monitor the consumption by new users and accordingly collect the bills. JEDCO will also make a seconded available to the PIU in order to ensure the effective operation of the newly constructed grid and will be engaged in the supervision of the contractors.

Component 2. Mini-grid pilot.(.\$13M.)

Strategic priorities of the GoSS are to electricity state capital cities and potential cities. Previously, in South Sudan, the isolated grid operations in various areas including Yei, Maridi, and Kapoeta didn't work successfully, and it is important to identify the effective operation modality. Thus, MoED will pilot the mini-grid operation which could be duplicated to other state capitals and large cities. In addition to piloting the operation modality, MoED will carry out feasibility study for potential mini-grid sites and prepare the effective PPP model. In this effort, the team will closely collaborate with the IFC Scale-up Minigrid (SMG) team to guide the government to achieve their strategic priority.

To pilot an effective operation of a minigrid, this component will support the hybridization and rehabilitation of existing isolated grid with a solar hybrid with battery storage in the town of Yei. Based on high level geospatial analysis and survey activities in Yei town, it is tentatively considered that a solar PV system with a capacity of 5 MW, 12,000 kWh of batteries, and the existing 1.2 MW capacity of a diesel backup will be implemented initially. This pilot intervention is expected to electrify about 10,000 households, 850 commercial and institutional customers in host communities and refugees.

Yei is selected as a pilot based on multiple criteria considering i) evidence of high electricity demand, including the demand for productive use; (ii) the existence of the generation and distribution assets that can be partially restored



for usage; (iii) the MoED/SSEC’s prior experience in the grid, iv) absence for other public/private players already investing for rehabilitation.

- a. High electricity demand. According to a survey and consultation with various potential anchor customers, sizable load demands including UN agencies, more than 30 NGOs, factories, and commercial customers are identified and will be further investigated through a more thorough ground-level survey.
- b. Existence of the generation and distribution assets. In 2008, Yei Electricity Cooperative Organization (YECO), which is a community-based organization, commissioned the grid operation with the support from USAID. While the grid operation has been halted since 2016, 1.2 MW capacity of diesel generators are still functional, but the grid network needs to be replaced and rehabilitated .
- c. The government’s prior experience and familiarity with the potential site. SSEC has conducted the assessment of the existing generation and distribution assets in Yei in May 2022. In addition to the experience and familiarity with the potential site, it is also important to consider the accessibility and distance to potential site for preparation and implementation purposes.
- d. Absence of public or private entities. In South Sudan, the limited number of private developers have been involved in the provision of electricity through mini-grid solutions. The team has identified the ongoing dialogues between the government and private developers in Aweil, Wau, Yambio, and Bor, Malakal. Under this project component, the feasibility and viability of additional potential sites – particularly, state capitals – will be carried out in a consultation with the government.

Under the project, the MoED will procure a contractor to rehabilitate, hybridize and operate the grid for certain period of time. An EPC contractor will be selected competitively and responsible for building the generation and distribution capacity. Given the utility’s lack of technical capacity and experiences in the operation, the private operator will be selected, potentially as an integral part of the bidding for the construction contractor and operators of the grid for pre-defined period. Throughout the process, given the weak government capacity, Owner’s Engineer will be recruited to guide the government for Components 1 and 2. The cost of grid operation, including the overhead cost and service fees, beyond the project’s closing will be solely financed through the tariff revenue collected by the private operator. After the end of the operation contract, the MoED/SSEC can renew the operation contract or take over the operation if sufficient capacity has been built in the utility.

In addition to the pilot in Yei, MoED will implement the feasibility studies of selected state capital cities or potential sites such as Malakal, Aweil, Kwajok, Torit, and Bentiu. For many potential mini-grid sites across the country, MoED and SSEC lack even basic information on the condition of existing infrastructure and the energy and infrastructure needs of those communities (e.g., city markets, as an anchor customer). This activity will therefore fund stocktaking of existing infrastructure and demand and energy consumption profiles, as well as preliminary mini-grids design to serve these communities in anticipation of future financing from the Bank, other development partners, or private investors.

Component 3. Off-grid electrification of health facilities through standalone solar systems (\$10 million equivalent - US\$7million, US\$3 million PHRD)

This component will finance the delivery of solar and battery-based off-grid solutions for selected health institutions in rural areas, with priority on Payam-level hospitals (population of 25K and over) Health Care Centers (PHCCs). This



component will cover approximately 50 health facilities in the Greater Upper Nile Region (Upper Nile, Jonglei and Unity states, Ruweng Administrative Area, Pibor Administrative Area) with current Bank operation, as well as other states identified as a result of further assessment in coordination with the Ministry of Health, which will be selected based on structural integrity of the buildings, level of service provided (availability of CEmONC - Comprehensive Emergency Obstetric and Newborn Care services, etc.), population coverage, pre-existing use of electricity and whether internal wiring is in place, etc. This contributes towards reducing the ratio of maternal and newborn mortality rate in South Sudan. (e.g. WHO, UNICEF, UNFPA, World Bank Group, and the United Nations Population Division data shows that until 2017 maternal mortality ratio was 1,150 out of 100, 000 live births).

The component intervention will prioritize health facilities with large catchment population to maximize the impact. They will include facilities in relatively large regional towns and settlements, including host communities and refugees in Jamjang (Ruweng Administrative Area) and Maban (Upper Nile State). The facilities in these areas are used both by host communities and refugees.

The project will ensure proper level of coordination with the Ministry of Energy and Dams and Ministry of Health. It is foreseen that the MoED will contract the UNICEF for implementation of this component. UNICEF, supported by the ESMAP/World Bank, is currently implementing polarization of 12 secondary health facilities which deliver CEmONC (comprehensive emergency obstetric and neonatal care) services in the states of Upper Nile and Jonglei, providing a 24-hour power to facilitate consistent access to essential services. Using the preliminary assessments done by UNICEF for an additional 187 health facilities, the team will conduct in-depth analysis to determine the beneficiary health institutions for the project.

One of the most important and critical aspects of the proposed activity is to ensure the sustainability of daily operation and maintenance of installed equipment. Considering the remoteness of the health facilities from main cities and the difficulty with transportation, especially during the flood season, it will be vital to arrange trainings for either the staff of the health facilities or members of the local community. This will not only ensure reliable electricity supply but will also allow engaging the local community in the process, resulting in an ownership and care feeling for the installed equipment which will result in decreased security threats and avoidance of theft and vandalism. In order to take care of minor renovations and ensuring smooth operation of the equipment, each facility will be provided with quick-fix spare parts, which the locally trained staff will be able to use. In case of a major breakdown, there will be a need for professionally trained specialists to visit the site, bringing the necessary major renovation parts.

In addition to the core electrification of health facilities, the intervention may provide a share of electric energy for productive use to local community. Since a majority of the health facilities usually have water supply wells, those will be considered as part of the projects, with a potential to share the water with the local community as well. This can also include battery/phone charging, agri-processing (e.g., mills), and cooling (e.g. refrigerators, milk chillers).

Component 4. Technical assistance and capacity building (US\$ 10 million)

This component will provide technical assistance to MoED, SSEC, and other relevant institutions as necessary to develop the legal, regulatory, and institutional basis for sustainable sector growth and planning and mobilization of private sector investment both for on-grid and off-grid. The component will also provide funding to support project implementation and strengthen day-to-day institutional capacity and operations.



Subcomponent 4.1. Development of electricity sector legal and regulatory framework. This subcomponent will support enhancement and finalization of the 2015 Electricity Bill, revisions to which have been delayed as result of inadequate resources and relevant expertise at MoED. The existing Bill suffers from several gaps from and weaknesses, including its overly narrow focus on establishment of a regulatory body and various ambiguities and inconsistencies that could undermine future sector development. The subcomponent will also support development of sector regulations, including a grid code, a tariff setting and design mechanism, and licensing and quality standards. This will include development of an PPP framework in the electricity sector to effectively attract and regulate private sector players, including for connection and dispatch of new generators to the Juba network and operation of isolated grids. Though MoED has made it a priority to establish an independent regulatory authority, development of regulations under this subcomponent will not be contingent on the establishment of such an authority and will also be implantable by MoED itself until a regulator has been established. The subcomponent will also review and revise if necessary the 2011 South Sudan Electricity Corporation Act – which established SSEC – and support preparation of business, HR, and incentive plans to better define the role and strategic direction of SSEC.

Finally, this subcomponent will also support review and updating of 2013 National Electricity Policy and Strategy, which has increasingly obsolete during the political and sector developments that have occurred in the decade since its publication.

Subcomponent 4.2. Electricity Sector Planning. This subcomponent will support generation, transmission, distribution and electrification planning and development of planning capacity at MoED. Rather than expend significant resources to develop ambitious, high-level, long-term plans in a volatile environment, plans prepared under this subcomponent will focus on the near- to medium-term and identify a small number of the most likely key scenarios, providing practical recommendations that MoED will be able to implement immediately. These scenarios may include, for instance, a base case in which a growing number of isolated grids is eventually reinforced through a core transmission backbone and connected to other East African power systems, and an accelerated scenario in which private sector interests in oil or other key industries accelerate development of interconnectors and other infrastructure. Preparation of the plan will be sequenced to ensure that key strategic outputs are made available to the MoED at an early stage. Particular emphasis will also be given to building in-house planning capacity at MoED through modern digital planning tools and extensive training on their use.

Subcomponent 4.3. Off-grid sector development. This subcomponent will target market development of the nascent South Sudanese off-grid solar sector, aiming to both existing South Sudanese businesses already active in off-grid distribution as well as incentivize increased market entry from more established international actors. Specific activities will include initial design work for a demand-side subsidy program, as affordability was identified by Bank-financed off-grid market assessment as the main constraint for households in adopting off-grid products; initial design work on a supply-side financing program, potentially including results-based financing (RBF) grants or concessional working capital loans; and development of the basic elements of off-grid regulation and public strategy, including definition of quality standards for systems and components and potential tax implications and exemptions for quality compliance.

Subcomponent 4.4. Support for the Project Implementation Unit (PIU) and capacity building. This subcomponent will support the PIU to cover incremental costs of project management. This includes engagement of individual



consultants/consulting firms to support specific component activities as well as strengthening of MoED capability in fiduciary, management, gender equality and environmental and social safeguards for project implementation. The sub-component will also include technical assistance to enhance sector fiduciary arrangements as well as setting up an E&S risk management system, enhancing the E&S capacity through staffing and training on the Environmental and Social Framework (ESF) requirements based on a robust capacity building plan and gender equality intervention areas that intended to address the existing gender gap in MoED.

D. Environmental and Social Overview

D.1. Detailed project location(s) and salient physical characteristics relevant to the E&S assessment [geographic, environmental, social]

South Sudan is a landlocked country that lies between latitudes 3°N and 13° N and longitudes 24°E and 36°E. The country’s territory covers 644,329 km² and has many plains and plateaus that are drained by the Nile and its numerous tributaries. The country declared its independence from Sudan in July 2011. South Sudan is endowed with a wealth of biodiversity, which provides the country with great opportunity for socioeconomic development, as well as many biological resources that have considerable economic and social values. The country has a wide range of habitats, including lowland forest, montane forest, savannah woodland, savannah grassland, wetlands and floodplains, the Sudd Wetland, and the semi-arid region in the north, which support a very rich diversity of animal and plant species. However, such biodiversity, including wildlife, is currently under threat, due to weak environmental regulation, poor development planning, fires, and most importantly, fragility resulting from conflict, instability, and insecurity. Households in South Sudan predominantly use biomass to meet their energy needs, which involves burning charcoal, wood, grass, cow dung and agricultural residues. Over 96% of the population use firewood or charcoal as their primary fuel for cooking. Firewood, grass and paraffin lamps are the most used sources for lighting. Costly diesel generators are mostly used to produce the electricity, as there is no national grid electricity supply (Government of South Sudan Initial National Communication to the United Nations Framework Convention on Climate Change, 2018).

South Sudan has experienced various armed conflicts since 1955. Ongoing tensions with Sudan over oil revenues, land borders, armed groups, rebellions, and inter-communal violence have threatened South Sudan since its independence in 2011. These tensions have resulted in frequent conflicts, which have adversely impacted the environment, the South Sudanese people and the country’s natural resources (South Sudan First State of Environment and Outlook Report 2018). In 2013, additional civil war among internal factions – along ethnic and clan lines - left the country shattered. In September 2018 a peace agreement was signed between the warring factions. However, local conflicts still flare up following the agreement. While the situation remains fluid, the recent reduction in armed conflict may facilitate substantial population movement. About 1.3 million people have returned from displacement within or outside South Sudan since 2016. The risk of spread of Coronavirus Disease (COVID-19) is high. The pandemic could push the people, especially the vulnerable poor and the displaced, deeper into destitution and the country faces the risk of further destabilization.

The power sector in South Sudan is experiencing severe shortage of supply and extraordinarily high electricity tariffs. The country’s total installed power capacity is approximately 141 MW; however, power demand is estimated at 300 MW, an amount that is expected to grow during peacetime. Much of the country’s generation is currently not operational due to lack of fuel and spare parts. Urban centers outside of Juba, such as Malakal and Wau each had



isolate grid infrastructure that were destroyed during the conflict of 2013. Furthermore, due to the high cost of imported fuel, grid customers in Juba pay an average tariff of 42 US cents per kWh, which is among the highest in Africa despite the poor quality of supply.

The proposed project focuses on increasing access to electricity in urban, peri-urban and rural areas through mini-grids and off-grid solutions. Recent energy sector development efforts have focused on revitalizing infrastructure and boosting power generation around Juba, the capital city, but the rest and largest part of the country remains in the dark. Only two other urban areas outside of Juba (Renk and Bor) have access to a grid that is supported by SSEC.

D. 2. Borrower's Institutional Capacity

South Sudan National Electricity Sector Policy (May 2007)/ South Sudan National Electricity Bill (2015) highlights the need to establish a highly competent and independent regulatory body and specifies the responsibility of the regulator by and large to include, licensing electricity service providers, enforcement of quality of service, as well as compliance of environmental standards, review of tariff applications, regulatory reporting and oversight functions. South Sudan has legal frameworks related to management of environmental and social risks such as the National Environment Policy (NEP; 2015-2025) which was developed to manage the environment and ensure the wise exploitation of natural resources in the country (oil, energy, mining, forest, water, land, animal, fisheries, wildlife, biodiversity, mountains, natural heritage). It's also established the Ministry of Environment which is responsible for the development and implementation of environmental policy and legislation at a national level to protect the environment and ensure sustainable development. This project will support South Sudan in achieving renewable and clean energy through solar systems that are often coupled with backup battery storage, and solar home systems. The project also supports the construction of distribution networks and plays a role in grid expansion.

However, the proposed project implementing entity (the Ministry of Energy and Dams) has no experience in management environmental and social risks of World Bank financed projects. It has no unit/department or staff who can oversee management of environment, social, health and safety risks of energy projects. During implementation of projects, EHS risk management services were sourced from the Ministry of Environment. The sector currently lacks resource to engage key personnel for project preparation, such as safeguards and fiduciary specialists. To mitigate this risk, it is critical that MoFP play a role to make necessary personnel available to the electricity sector, potentially shared with other Bank-financed projects. The client will also engage specialized consultants to extensively support the client for the preparation of the project, in particular for the preparation of environmental and social risk management instruments and the Project Procurement Strategy Document (PPSD). Hence, significant E&S staffing and capacity assessment shall be undertaken as part of project preparation and enhancement measures will need to be implemented to ensure that potential E&S risks of the project could be properly address. A detailed capacity assessment and capacity building action plan has been prepared as part of the ESMF The Ministry shall recruit one environmental and one social risk management specialists who will based in the project implementation unit. E&S focal persons shall also be assigned at five major towns including Malakal, Aweil, Kwajok, Torit, and Bentiu Cities. which will be beneficiaries of the project .The PIU will also hire a GBV specialist for the project. The Bank will organize trainings on the ESF and Project-specific E&S risk management tools that has been prepared for this project. The MoED will collaborate with the Ministry of General Education and Instruction and will work with the SSEC, JEDCO, UNICEF and other relevant stakeholders to implement the project. UNICEF will be the implementation partner for component 3. The MoED will establish a Project Steering Committee (PSC) to provide strategic guidance and overall oversight during project implementation and to ensure effective coordination among all the stakeholders. The PSC will be chaired by the Undersecretary of the MoED and will include representatives from MoF, SSEC, MoH, and



MoGEI. Since the key regulatory agency (MoEF) for ES risk management may have limited in providing appropriate risk management oversight in the World Bank financed projects, the project will provide the necessary capacity building support to the agency. The third-party monitoring agency which may be engaged by the project will also monitor the ES aspects of the project where appropriate.

The establishment of a functioning E&S risk management implementation arrangements has been included as one of the major commitments in the Environmental and Social Commitment Plan. Compliance with environmental and social standards shall be monitored in different ways. Quarterly and annual environmental and social monitoring reports will be prepared by the PIU and will be shared with the Bank. There will be independent annual environmental and social audits. During the project implementation, the PIU will closely work with relevant regulatory agency so that site specific environmental and social risk management tools could be reviewed and cleared by the agency. Details of E&S procedures and requirements of the E&S management tools has been specified in the ESMF.

II. SUMMARY OF ENVIRONMENTAL AND SOCIAL (ES) RISKS AND IMPACTS

A. Environmental and Social Risk Classification (ESRC)

Substantial

Environmental Risk Rating

Substantial

There are various potential environment, health and safety risks that can result at the during construction and operation of the off-grid and mini-grid products and materials as well as associated civil works. These include: i. Generation of hazardous and non-hazardous wastes including e-wastes (from Component 1 and 2 activities). A solar power system involves the use of rechargeable batteries including lithium-ion, nickel metal hydride, nickel cadmium and lead acid batteries. These batteries, especially nickel cadmium and lead acid batteries can have potential for environmental and health impacts if not properly transported, stored, and disassembled/recycled. They can cause serious environmental impacts because of the chemicals and heavy metals. Another emerging environmental issue associated with solar PV energy systems is exhausted solar panels. Leachate generated on landfills of PV solar panels could cause water/ground pollution. There are potential environmental risks that can result from the use of back up diesel generators. Gensets (diesel generators) can contribute to air pollution during operation and may account for water/ground pollution from fuel spill overs during transportation and storage. Other pollutants include packaging materials of PV panels, battery banks, etc. Transportation of diesel in relation to construction activities and hybrid renewable-diesel power generation units can have potential environmental risks. Besides, end of life power generation units may account for environmental pollution. Localized air quality pollution could result from operating machinery (i.e., fumes) and dust generation from earthworks. Wooden poles for distribution are treated with chemicals during manufacturing that can lead to leaching and the formation of surface residues at the right-of-way. ii. Small scale soil erosion, sedimentation, and landscape disturbance (from Component 1 and 2 activities). This may result from civil works of mini grids which among others include the construction of a powerhouse for the storage of the battery banks, genset, battery inverters and combiner boxes as well as during erection of distribution network poles. iii. Potential risks to flora and fauna. Wooden poles may be used for distribution line construction purpose which can lead to cutting of considerable number of trees. Vegetation clearance under and around mini grids in order not to obscure the incoming solar radiation, clearance of Right of Way (ROW), fuel and oil leakages (during transportation and storage) can affect wildlife and ecosystems. Accidental fire which could be caused by trees falling on distribution network cables, in case of large mini-grid systems with high current and voltage levels due to high magnetic fields), improperly stored/handled, fuel and overheating of battery banks etc. may have adverse impacts on

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flora and fauna. iv. Potential use of energy by health care facilities, schools, public buildings, and enterprises/farmers. Construction and operation activities of the project may lead to use of energy resource for different construction and operation related activities. iv. Potential risks to workers and community health and safety. Construction and operation activities may expose project workers to various accidents. Occupational accidents can occur in all stages of the life cycle of off-grid solar materials. The transportation of materials and machinery may lead to increase in traffic congestion and road accidents. Diesel generators, vehicles, and construction machineries activities can cause an increase in the noise levels which can affect workers and the communities. Technical assistance activities may also have potential downstream risks if not implemented following the requirements of the ESF. At this stage, considering the above potential environmental risks as well contextual risks including limited capacity of implementing agency, the environmental risk of the project is rated as substantial.

Social Risk Rating

Substantial

The risk classification of the project is substantial, considering the broader contextual risk such as political instability (induced by potential civil unrest), contextual GBV/SEA risk, The project is not complex or large in scale, does not involve activities that have a high potential for harming people. Social impacts associated with project activities will generally emanate from the construction of grid system, hybrid and solar PV battery storage mini grid for households and enterprises t. These include small scale land acquisition and/or livelihood disruption, risks linked to non-compensation for affected crops and trees, influx of labor into targeted areas (though not significant), lack of adequate consultation with affected persons and access to functioning grievance redress mechanisms, as well as social exclusion of women, youth, and other members of underserved and vulnerable groups, including refugees and host communities (potential targets of the Project) . Apart from the project related risk there is a broader contextual risk on security remote location of many subprojects, social conflict, violence against children and child labor and Sexual exploitation and harassment risks in South Sudan. Considering the weak ES risk management capacity of the client and the identified risks, the social risk of the project is rated as substantial.

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B. Environment and Social Standards (ESSs) that Apply to the Activities Being Considered

B.1. General Assessment

ESS1 Assessment and Management of Environmental and Social Risks and Impacts

Overview of the relevance of the Standard for the Project:

The activities to be financed by the project will have a range of environmental and social benefits. For example, electricity production through solar panels is clean and renewable. It can also avoid greenhouse gas emissions. Nonetheless, the project activities can also adverse environmental and social impacts as noted in section II A which include (i) generation of hazardous and non-hazardous wastes including e-wastes; (ii) small scale soil erosion, sedimentation, and landscape disturbance; (iii) potential risks to flora and fauna including birds; and (iv) potential risks to workers and community health and safety (v). Potential use of energy by health care facilities, schools, public buildings, and enterprises/farmers (vii). Community Health and Safety risks related with Infrastructure and Equipment Design and Safety; Safety of Services; and Traffic and Road Safety.

Apart from the contextual risks such as security and SEA/SH risks, the project will have the following project spsocial risks: i) involuntary displacement, loss of livelihoods and restricted access to natural resources, ii) GBV/SEA/SH and violence to children, and iii) child labor to potential adverse risks.



The Ministry of Energy and Dams (MoED) has prepared an Environmental and Social Management Framework (ESMF) which will be used as a basis for identification and management of environmental and social risks of the project activities which will be implemented by the public sector prior to appraisal. The ESMF also includes GBV risk assessment and GBV/SEA/SH Prevention and Response Action Plan.. MoED has also prepared an Environmental and Social Commitment Plan (ESCP) that outlines among others the Ministry's commitment to: i) implement the project activities in compliance with the requirements of the applicable environmental and social standards of the Bank's Environmental and Social Framework; ii) screen the subprojects per ESMF and prepare site-specific subproject E&S risk management instruments (e.g. ESMPs) and ensure assessment of EHS risks in project technical assistance related studies; iii) put an environmental and social risk management implementation arrangements including deployment of qualified staff at different levels of implementation including a capacity building program; and iv) monitor and report on the implementation of environmental and social risk management tools. It has also prepared a Social Assessment, Labor Management Procedure and a Security Risk Management Plan (SRAMP). The SRAMP outlines the Project's approach to address the pertinent security risks in the project sites. This includes approaches to security risk assessments and categorization, security provisions for different types of workers and communities (on a large spectrum from prevention to response), institutional cooperation with security actors in the region (local, national, international, WB), decision making processes, and according documentation.

Specific subproject E&S risk management instruments and plans (e.g. ESAs ESMPs etc) will be prepared during project implementation (prior to commencement of sub-project activities) following the requirements of the overall ESF and guidance provided in ESMF. The ESMF will be used as basis for identification and management of potential direct/indirect EHS impacts/risks associated with the project activities.

Technical assistance and capacity building support activities)will be undertaken in compliance with Bank Advisory Note on Technical Assistance and the ESF. If any technical activity would involve detail design and feasibility, an environmental and social assessment will be conducted proportionate to the anticipated risks of the technical assistance or TORs will be prepared for the feasibility/design studies that ensure that relevant environmental and social issues are taken into account in conducting the studies in a manner that is consistent with the ESF. The requirements set out in paragraphs 14-18 of ESS1 will be applied to technical assistance activities as relevant and appropriate to the nature of the risks and impacts. The terms of reference, work plans or other documents defining the scope and outputs of technical assistance activities will be drafted so that the advice and other support provided is consistent with ESSs 1-10.

Under Component 1- Isolated grids development and densification, given the possible need for land acquisition and/or physical or economic displacement as well as restrict access to and use of natural resources, a Resettlement Framework (RF) has been prepared, in consideration of the requirements of ESS5 and national legal frameworks taking gender issues into consideration, and where necessary Resettlement Plans will be prepared prior to starting Project activities on the ground. The RPF provides necessary principles for the preparation of site specific Resettlement plans during implementation. MoED has prepared a Social Assessment which sets out measures and actions to address the risks of exclusion or discrimination towards the disadvantaged or vulnerable individuals or groups including the historically underserved communities /SSAHUTLC/ in the context of South Sudan and in accordance with the requirements of the ESS1 and ESS7.

Furthermore relevant E&S standards, WBG EHS Guideline and sector specific EHS guidelines for Electric Transmission and Distribution, Health Care Facilities, Thermal Power Generation, Wind Energy and other and other relevant WB



guidance notes will be applied. For the preparation of the master plan in the energy sector, the client can rely on the SESA which was conducted in 2016 for the energy sector with some updates during implementation stage.

ESS10 Stakeholder Engagement and Information Disclosure

The objective of the stakeholder engagement is to incorporate views from all stakeholders through meaningful consultations and feedback to improve the environmental and social sustainability of the project, enhance its acceptance, and make a significant contribution to successful project design and implementation. The project will require inputs from different stakeholder groups, including those who will be directly affected as well as those who have other interests in the project interventions. The Ministry of Energy and Dams (MoED), South Sudan Electricity Corporation (SSEC), Juba Electricity Distribution Company (JEDCO), the sole electricity service provider in the capital Juba, as a joint venture/public-private partnership (PPP) between MoED and Ezra Construction and Development Group Company Ltd. UNICEF, CSOs, NGOs, the MoH, MoFP, MoEF and the MoGEI. are among the key stakeholders to be listed for this Project. On the other hand, the private sector in the off-grid market, civil society organizations, communities, etc. extends the list of stakeholders under SSEA Project. The mapping of stakeholders, respective interest, roles and responsibilities will be defined and updated before appraisal.

In consultation with the Bank team, a Stakeholder Engagement Plan (SEP) has been developed with specific provisions for the different project components. The SEP outlines the characteristics and interests of the relevant stakeholder groups and timing and methods of engagement throughout the life of the project. The project will ensure that the needs and voices of vulnerable people (female-headed households, elderly, youth, people with disabilities; IDPs and Historically underserved communities) are heard through inclusive consultation and participation to ensure that they can equally participate and benefit from the project. The project will also ensure that respective provisions on gender equality and the mitigation of gender-based violence in the energy sector will be implemented; to avoid potential adverse impacts but also to ensure strong participation of women in the development of the country's energy sector. The social assessment which identifies the project risks and impacts in relation with vulnerable groups, people with disabilities, service barrier to women and mitigation measures to tackle the identified risks has been prepared and key findings are included in the project ESMF as well as the project design.

The client will seek stakeholder feedback and opportunities for proposed future engagement, ensuring that all consultations are inclusive and accessible (both in format, language and location) and through channels that are suitable in the local context. The Project implementing entities are required to engage in meaningful consultations with all stakeholders throughout the project life cycle.

As a key focus of the project is to ensure that vulnerable groups including indigenous/ underserved people can access project benefits, the stakeholder engagement process shall ensure that their views are incorporated in project design and implementation, and that risks particularly affecting women and girls are adequately assessed and mitigated. For the underserved communities meeting ESS7 criteria, the project will ensure that any specific engagement requirements for their participation are provided in the SEP

The project will identify various individuals or groups who i) are affected or likely to be affected (directly or indirectly) by the project ("affected parties"), or ii) may have an interest in the project ("other interested parties"). The SEP will



ensure that beneficiaries and affected communities will be engaged, especially regarding electrification options, design and location. It will also consider the differential needs and participation requirements of men, women and those more likely to be excluded from participation due to their circumstances as the project location would be remote and difficult to access. Due to the likelihood of project's footprint at historically underserved and vulnerable communities in the country, any specific engagement requirements for their participation will be provided in the SEP.

The SEP includes a robust GRM with provisions for IP/SSAHUTLC, refugees/returnees, and survivors of SEA/SH. Specific assessments of a feasible approach on SEA/SH has been developed as part of the Gender and SEA/SH assessment. Grievance mechanism (GRM) has been developed to provide an avenue for complaints regarding with project activities. The GRM would include mobile-phone based applications, and in-person centers for complaint registration and resolution, and a free hot line linked with a call center.

B.2. Specific Risks and Impacts

A brief description of the potential environmental and social risks and impacts relevant to the Project.

ESS2 Labor and Working Conditions

ESS2 is relevant for the project due to direct, and contracted workers employed or engaged by the Project implementing agencies, and primary supply workers for the activities under Component 1. Grid densification and extension in Juba r Component 2. Mini-grid pilots and Component 3. Off-grid electrification of health facilities through standalone solar systems and Component 4. Technical assistance and capacity building,. . However, community workers are not expected to engage in this project.

These workers may be exposed to occupational health risks during construction, maintenance, and operation activities. The client has prepared labor management procedures (LMP) proportional to the activities, risks and impacts which provide detailed information on the work terms and conditions including explicit prohibition of child labor. Differentiated provisions has been provided to the different workers under the project, i.e. civil servants, specific PIU staff, Contractors staff and consultants, and others. Finally, the LMP also outlines the establishment and availability throughout the project life cycle of labor-specific grievance redress mechanisms accessible to the different range of workers. To ensure health and safety of workers during the construction and operational phases of the project, Occupational Health and Safety (OHS) plan in line with Good International Industry Practice (GIIP) will be prepared as part of the C-ESMPs. The project implementing entity shall put measures necessary for safety and security of project workers.

The plan will include procedures on incident investigation and reporting, recording, and reporting of non-conformity, emergency preparedness and response procedures, and continuous training and awareness to workers. Besides, the project has developed labor-management procedures (LMP) that I sets out how project workers will be managed including a code of conduct to mitigate GBV related risks and promote safe workplace behavior. Occupational Health and Safety (OHS) measures will be applicable to all project workers. Construction activities as well as installation and maintenance of off-grid solar materials can expose workers to different occupational accidents. Activities under densification and installation of transformers could also have health and safety impacts. Collection and recycling practices lack basic precaution measures to prevent the emission of lead and battery acid to the workspace and the environment. This causes severe and potentially life-threatening health risks for workers and the communities



surrounding such operations. Hence, due attention will be given to training of workers on OHS risks and awareness to minimize the risks.

The OHS risk mitigation measures which will be described in the LMP shall cover: (a) identification of potential hazards to project workers; (b) provision of preventive and protective measures, including elimination of hazardous conditions or substances; (c) training of project workers and maintenance of training records; (d) documentation and reporting of occupational accidents, diseases and incidents; (e) emergency prevention and preparedness and response arrangements to emergency situations; and (f) remedies for adverse impacts such as occupational injuries, disability and disease. Contractors will be required to prepare and implement Occupational Health & Safety Plans (OHSP) following the World Bank Group Environment, Health and Safety (EHS) General Guidelines, adopt a code of conduct to all workers and establish worker-specific GRM (accessible for direct and contracted workers) before commencement of the civil works. Besides, the project will have a channel which will specifically address SEA/SH complaints in a confidential and survivor based manner. Workers should be trained on community health and safety aspects of the project.

Bidding documents shall include budget provisions for all OHS risk management activities as well as other costs associated with labor management (e.g. the operation of a grievance redress mechanism). The Ministry will regularly monitor the contractor's performance in implementing OHS measures. The Ministry's quarterly E&S performance report should include a section on performance on the OHS implementation. The Ministry shall also provide the necessary oversight on the adequacy of the private sector's ESMS to ensure compliance with ESS2 including management of OHS risks.

To manage any risk of forced labor in the supply chain for solar panels and solar components, relevant procurement processes involving solar panels/solar components must be strengthened by including forced labor bidder declarations, qualification requirements and strengthened contractual provisions, requiring mandatory prior review. To implement this requirement, the project implementing entity shall include relevant provisions and declarations in procurement documents for Solar Panels/Solar Panel Components as well as the requirement for mandatory Bank's prior review/No-objection.

ESS3 Resource Efficiency and Pollution Prevention and Management

ESS3 is relevant as improper disposal of batteries can cause pollution including air, soil, and water contamination. The batteries which will be used in solar power system may include nickel cadmium and lead acid batteries that can have adverse environmental and health impacts if not properly transported, stored, and disassembled/recycled because of the chemicals and heavy metals. Leachate generated on landfills of PV solar panels could cause water/ground pollution.

Potential environmental risks that can also result from the use of back up diesel generators. Gensets (diesel generators) can contribute to air pollution during operation and may account for water/ground pollution from fuel spill overs during transportation and storage. Other pollutants include packaging materials of PV panels, battery banks, etc. Small scale soil erosion and sedimentation may result from civil works of mini grids which among others include the construction of a powerhouse for the storage of the battery banks, genset, battery inverters and combiner boxes as well as during erection of distribution network poles. These construction activities can contribute



to environmental pollution such as air, solid, and liquid waste including construction waste, and water pollution. Localized air quality pollution could result from operating machinery (i.e., fumes) and dust generation from earthworks. The wooden utility poles are treated with pesticide preservatives to protect against insects, bacteria, and fungi, and to prevent rot. The preservatives commonly used for power poles are oil-based pesticides such as creosote, pentachlorophenol and chromnated copper arsenate. While in use, poles may leach preservatives into soils and groundwater, however, levels are highest directly beside poles and decrease to within normal levels at approximately 30 centimeters (cm) distance from the pole. The most significant potential environmental impacts occur at specialized wood treatment facilities if not managed appropriately. Pesticide use, if any, should be established through Integrated Pest Management (IPM) strategy. It is also essential to evaluate benefit of using alternative pole materials (e.g. steel, concrete, and fiberglass). Sulphur hexafluoride which may be used to insulate high-voltage circuit breakers, switches, and other equipment used in the distribution network is a potent greenhouse gas and can also cause health problems (lung damage) if workers are exposed to SF6 decomposition gas during routine maintenance. Sediment and erosion from construction activities and storm water runoff may increase turbidity of surface watercourses. Due attention will be given to addressing environmental issues associated with used oil management during construction and operational phases as well as the use of ecologically appropriate transformer fluids. Besides, management, disposal and recycling of solar panels, used batteries especially lead acid and lithium-ion batteries, defective and used solar panels, polychlorinated biphenyls (PCBs) from older imported transformers and capacitors shall be undertaken following acceptable procedures for management hazardous .

Though there are project activities that utilize energy for construction the project is not anticipated to cause significant energy. Site specific ESMPs will also adequately cover pollution prevention and management measures. The Project activities will also be implemented in compliance with the requirements of IFC’s Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution so that potential risks could be minimized. Similarly, the project technical assistance studies/activities will properly include ESS3 considerations.

ESS4 Community Health and Safety

ESS4 is relevant as the project activities could cause various community health and safety risks. The majority of the unskilled workers will be sourced from the community members in the project site and a few required skilled workers from outside of the project area. The project is not anticipated to contribute to a significant labor influx in the project sites, as the project scope is limited and implemented throughout the country it is expected that the attractiveness of the project by outside labor sources will be much less than the absorptive capacity of the anticipated project implementation target area. However, potential community health and safety risks in the project sites are related to an increase in crime, prostitution, gender-based violence (GBV), and sexual exploitation. There are potential community health and safety risks resulting from electromagnetic fields. Also, the project could contribute to potential structural safety risks such as electric shocks during installation and connections, The transportation of materials and machinery may lead to increase in traffic congestion and road accidents. Accidental fire may be caused by trees falling on distribution network cables, improperly stored/handled fuel and overheating of battery banks. Generators, vehicles, and construction machineries activities can cause an increase in the noise levels which can affect the communities residing near the project sites. To address these risks, the ESMF covers among others traffic and road safety management requirements and emergency procedure for accidental fire in addition to fire risk mitigation measures. Detail risk mitigation measures shall be prepared as part of the site specific ESMPs.



MoED will evaluate the risks and impacts of the Project components on the health, safety and security of the affected communities that are living in the Project affected areas during construction and operation, including impacts during the operation of the Project on participating education and health centers. These would include adverse social impacts such as labor influx and associated impacts of Gender-Based Violence (GBV), sexual exploitation and the transmission of communicable diseases such as HIV/AIDS and COVID 19 on local communities. Implementing entities will actively collaborate and consult with communities in promoting the understanding, and methods for, the implementation of community health and safety, including HIV and communicable diseases prevention, and informing communities about the requirements of workers' codes of conduct. Contractors will also provide project workers with training on respectful relations with communities, including on health and safety practices. While the civil works to be financed are limited in scale and scope, to ensure the health and safety of communities during the construction and operation phases of the project.

The ESMF has assessed exposure of communities to construction stage related traffic, road accidents, and health and safety issues. Further, all works, and operations will be planned, designed and implemented to comply with the WBG EHS guidelines. MoWD/ SSES, (including other subprojects' implementers will evaluate the risks and impacts of the project activities on the health and safety of persons in the project areas. The installation of Standalone Solar Systems in schools and health institutions, can disrupt regular functions of the institutions through impacts such as dust emission, noise, and increased generation of solid waste. The potential risks and mitigation measures for impacts on beneficiaries has been analyzed in the ESMF and will be further detailed in subproject specific ESIA/ESMPs.

Pervasive incidence of SEA/SH in South Sudan is a significant contextual challenge. Assessment of project SEA/SH has been conducted and a commensurate action plan for the identified potential risks developed. Given the context of pervasive SEA/SH, the project will adopt a robust approach to address potential GBV risks; including site-specific assessments of the availability of referral systems and its establishment if insufficient. Relevant mitigation measures to address these risks (e.g., integrating Codes of Conduct with SEA/SH related protections into community consultations and mapping activities to identify potential service providers, and establishment of GRM with procedures and channels to enable safe, confidential and ethical reporting of SEA/SH incidents) has been established in the draft SEA/SH action plan has been prepared as part of the ESMF The report will be finalized and disclosed before appraisal.

The project will include capacity building and training of relevant stakeholders including government partners, contractors and project workers; risks will be monitored throughout project implementation through regular re-assessment with the risk screening tool, particularly as new project locations are determined, and through regular monitoring engagement.

Ensuring security for project operations (including the protection of project workers, beneficiaries and affected persons) will be a challenge during implementation. To reduce and mitigate the potential security risks, the client has conducted security risk assessment and based on the findings of the assessment, Security Management Plan has been prepared . Both reports will be finalized and disclosed before appraisal.

ESS5 Land Acquisition, Restrictions on Land Use and Involuntary Resettlement



The project is not expected require significant land acquisition and resettlement. However, some of the activities such as Off-grid electrification of health facilities through standalone solar systems the expansion of the MV and LV networks, isolated grids development and densification along with their low-voltage distribution networks may require some private or communal land. At this point, no details are available; and the extent of land acquisition and the impacts thereof (on local people / communities) are not known. Hence, framework approach has been adopted. Accordingly, the client has prepared a Resettlement Framework (RF) which will be disclosed by appraisal in accordance with the requirements of ESS5 and South Sudan land expropriation legislatives. The RF establishes how site-specific Resettlement Plans (RPs) will be prepared, disclosed, and implemented, to mitigate and compensate potential risks and impacts associated with land acquisition, restrictions on land use and involuntary resettlement upon project affected persons, households, or community groups.

ESS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources

ESS6 is relevant as the project activities can have various potential risks to biodiversity and habitats. Right-of-way and land required for mini-grid construction activities may affect habitats and vegetation. Construction of solar mini-grids and solar home systems might affect critical natural habitats, in some ways. The ESMF will screen out subproject sites deemed to cause risks/impacts to areas of high biodiversity values, critical or sensitive natural habitats within project areas, protected areas, and endemic flora and fauna including protected animal or plant species. Wooden utility poles may be used for the distribution purpose which can lead to cutting of considerable number of trees. Fuel and oil leakages (during transportation and storage) from the project activities can affect wildlife and ecosystems. Accidental fire, if any, may have adverse impacts on flora and fauna. The distribution poles can pose potentially fatal risk to birds and bats through collisions and electrocutions. Power distribution lines may require construction of corridors crossing aquatic habitats that may disrupt watercourses and wetlands and require the removal of riparian vegetation.

Further assessment on potential risks of the project activities on biodiversity has been conducted during preparation of the ESMF and subproject site specific ESMPs will also adequately cover risk management measures for biodiversity and habitats as needed. However, if any potential adverse impact on biodiversity is identified, biodiversity management plan will be prepared where relevant. Besides, IFC's Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution shall be used as basis for management of potential risks to biodiversity and habitats. Similarly, the project technical assistance studies/activities will properly include ESS6 considerations.

ESS7 Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities

The majority of people in the country meet the requirements of ESS7 including many of the ethnic groups in South Sudan as well as in the project area and excluding only recent immigrants from other countries. The project design and implementation process of the proposed project therefore embeds its basic principles. Respective planning elements will be included in the project design. The project through SEP identifies the needs and priorities of all communities and include them in the project design. Further, the client has prepared a social assessment which the findings of the SA has been integrated into the project ESMF. The Project will build in an iterative social/conflict



monitoring throughout the project period to see how the project activities interact with the local dynamics, so that the project activities/approach can be adjusted in real-time.

The project design and implementation should consider the cultural appropriateness, affordability of technologies, maintenance (after service) alternatives, that may not be catered due to remoteness, and so on. The delivery of the project activities may require assessment of affordability of the household level technologies in the South Sudanese context, including those Historically Underserved Traditional Local Communities and vulnerable groups.

Selection of project components/ subprojects that would otherwise result in significant adverse impacts on land or natural resources traditionally owned or used by under-served/Indigenous communities, relocation, or impacts on these cultural heritages, will not be eligible for financing.

ESS8 Cultural Heritage

The potential risks of project activities to tangible and intangible cultural heritage shall be assessed as part of the ESMF. In other words, the project , through community consultation, shall identify tangible and intangible heritages, if any, and management procedures will be outlined in the site specific management plans. as relevant. Besides, Chance Find Procedures shall be adopted for precautionary reasons for infrastructure investments to address unknown archeological or historical remains and objects and procedure has been described in the ESMF.

ESS9 Financial Intermediaries

FI will not be engaged in this project

C. Legal Operational Policies that Apply

OP 7.50 Projects on International Waterways Yes

OP 7.60 Projects in Disputed Areas No

B.3. Reliance on Borrower’s policy, legal and institutional framework, relevant to the Project risks and impacts

Is this project being prepared for use of Borrower Framework? No

Areas where “Use of Borrower Framework” is being considered:

None

Public Disclosure



IV. CONTACT POINTS

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Implementing Agency: Ministry of Energy and Dams

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VI. APPROVAL

Task Team Leader(s):	David Loew, Kenta Usui
Practice Manager (ENR/Social)	Iain G. Shuker Cleared on 01-Mar-2023 at 08:41:11 EST
Safeguards Advisor ESSA	Julia Bucknall (SAESSA) Concurred on 05-Mar-2023 at 11:01:18 EST