



# Project Information Document (PID)

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Concept Stage | Date Prepared/Updated: 08-Jul-2022 | Report No: PIDC34144



## BASIC INFORMATION

### A. Basic Project Data

Country South Sudan	Project ID P178891	Parent Project ID (if any)	Project Name South Sudan Energy Access Project (P178891)
Region EASTERN AND SOUTHERN AFRICA	Estimated Appraisal Date Dec 12, 2022	Estimated Board Date Mar 31, 2023	Practice Area (Lead) Energy & Extractives
Financing Instrument Investment Project Financing	Borrower(s) The Republic of South Sudan	Implementing Agency Ministry of Energy and Dams	

### Proposed Development Objective(s)

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

## PROJECT FINANCING DATA (US\$, Millions)

### SUMMARY

<b>Total Project Cost</b>	50.00
<b>Total Financing</b>	43.00
<b>of which IBRD/IDA</b>	40.00
<b>Financing Gap</b>	7.00

### DETAILS

#### World Bank Group Financing

International Development Association (IDA)	40.00
IDA Credit	40.00

#### Non-World Bank Group Financing

Trust Funds	3.00
Japan Policy and Human Resources Development Fund	3.00



Environmental and Social Risk Classification

Substantial

Concept Review Decision

Track II-The review did authorize the preparation to continue

Other Decision (as needed)

## B. Introduction and Context

### Country Context

1. **South Sudan, a landlocked country in East Africa with a population of approximately 12 million, has experienced significant levels of fragility, conflict, and violence (FCV).** There was not only conflict with the North (now Sudan), which lasted close to half a century, but also significant inter- and intra-communal tension. The secession from Sudan came after decades of fighting, followed by a brief period of peace under the Comprehensive Peace Agreement (CPA, 2005–2011) and a final decision to declare independence in January 2011 following a referendum. South Sudan thereby became the youngest country in the world. Even after independence, the country has been devastated due to decades of instability and conflict with Sudan. War-induced poverty, displacement, and trauma weakened kinship and community ties, endangering participation, inclusion, transparency, and accountability. The Human Development Index (HDI) in 2019 still placed the country among the poorest in the world (185 out of 189 countries).<sup>1</sup>

2. **While the country is seeing long-awaited peace at the national level, subnational conflicts remain widespread and long-term prospects for consolidated peace and stability remain fragile.** The revitalized peace agreement, signed in September 2018, included provisions to reinforce a permanent ceasefire, create an enabling environment for humanitarian assistance delivery, institute critical reforms, and establish a new transitional government. Subsequently, the Transitional Government of National Unity was established in February 2020. The opposition leader, Riek Machar, was sworn in as the first Vice President on February 22, 2020, and a new cabinet of ministers was established in March 2020. More recently, a unified command of the country's armed forces was announced in April 2022. Despite this progress made toward sustained peace, conflict and violence remain widespread in the country. In 2021, close to 2,000 people were reported to have died due to conflict. The Transitional Government is scheduled to hold a national election in 2023, which, given the volatile situation, could either consolidate peace or trigger large-scale violence.

3. **The history of continued conflicts has resulted in a significant number of refugees, asylum seekers, and internally displaced persons (IDPs) and created refugee camps and IDP settlements on the outskirts of major cities.** South Sudan hosts some 330,000 refugees and asylum seekers, mainly from Sudan. The population of refugee camps in Jam Jang and Maban, close to the Sudanese border, is similar to the population of Juba, the nation's capital, once host populations are factored in. The prospect of the refugees returning to their origin in the near term is limited. In addition, 2 million South Sudanese people are internally displaced due to conflict, insecurity, and the impact of climate change. These internally displaced account for 15–20 percent of the South Sudanese population, and many of them sought safety in the outskirts of Juba and some state capitals in the country.

4. **After the civil war concluded, the country faced a series of economic shocks which resulted in continued poverty, food insecurity, and economic contraction.** While the economy of South Sudan showed signs of recovery after the peace accord

<sup>1</sup> United National Development Programme. 2021. *Human Development Report 2020*. New York: UNDP. <https://hdr.undp.org/en/content/human-development-report-2020>.



in 2018, shocks such as COVID-19, locust infestation, and flooding led to a contraction in the real gross domestic product (GDP) by 5 percent in 2021 that is expected to continue in 2022. The poverty rate is estimated to have increased to 79 percent in 2021, up from 77 percent in 2020. The food security situation has also worsened. In April 2022, 63 percent of the population faced either acute, emergency, or catastrophic food insecurity. Increasing international prices of food and agricultural inputs, coupled with a major flood in March 2022, are likely to amplify food insecurity.

5. **Recent macro-fiscal reforms of the Government of South Sudan (GoSS) are bearing fruit, but public financial management (PFM) needs to be further strengthened to ensure sufficient budgetary resources to deliver basic services.** After the Government stopped monetizing its fiscal deficit in September 2020,<sup>2</sup> domestic inflation is estimated to have cooled down from 54 percent in 2019 to 43 percent in 2021. The Government unified its official and parallel exchange rates in 2021, resulting in improved forex availability and stabilization of the local currency, the South Sudanese Pound (SSP). However, opaque PFM and widespread corruption<sup>3</sup> have led to the misappropriation of oil revenue and a lack of predictable fiscal transfers to subnational governments.<sup>4</sup> Despite the significant size of potential oil revenue to the Government, the salaries of civil servants in South Sudan are extremely low and seldom get paid on time.<sup>5</sup> This has led to a deterioration in the morale among civil servants as well as a brain drain to the private sector, notably the oil industry.

#### Sectoral and Institutional Context

6. **South Sudan faces one of the lowest energy access rates in Sub-Saharan Africa.** It is estimated that only about 7 percent of the population has access to electricity, most of which is concentrated in the capital city, Juba, which has the country's only large-scale functional distribution network. While some cities used to be partially served by isolated grids, most of this was destroyed during the civil conflict and subsequent conflict and is largely nonoperational. Many households and commercial and public institutions rely on diesel-powered generators, which are expensive to operate and require imported fuel and spare parts. Hence, South Sudan is unlikely to achieve universal access to affordable, reliable, sustainable, and modern energy under the Sustainable Development Goals 7 (SDG7) by 2030 in the absence of significant investment and scale-up of electrification activities.

7. **Most of South Sudan's electricity infrastructure outside of Juba is nonoperational.** The country's total installed power capacity is approximately 109 MW, all from thermal sources, of which around 76.5 MW is operational but only around 34.5 MW is available to the general public (table 1; available generation to the public is 66.5 MW when supply from Renk substation is included). The majority of other generators, many of which are in South Sudan's state capitals including Wau, Malakal, Bor, Rumbek, and Yambio, are nonoperational due to lack of adequate maintenance and destruction during the civil war. The lack of electricity services outside the capital has constrained the basic service delivery by health and educational institutions as well as state governments. While some large-scale facilities (for example, state-level hospitals) have diesel generators, the cost of fuel is often prohibitively expensive due to the transport cost and associated fees levied at various checkpoints in the country.

8. **The cost of electricity is exceptionally high in Juba, the country's only functional distribution grid, making it unaffordable to most residents.** Grid customers in Juba pay an average tariff of US\$42 per kWh, which is among the highest in Sub-Saharan Africa. Even the lifeline segment of the tariff for residential customers consuming under 100 kWh per month is priced at US\$31.6 per kWh. This is exceptionally expensive compared to the regional peers (US\$3.6 per kWh in Ethiopia and US\$13 per kWh in Uganda in 2018). In addition, as the tariff is denominated in US\$, the actual tariff that the customers pay is affected by the exchange rate of the SSP, creating a level of unpredictability and a general upward trend in SSP-denominated

<sup>2</sup> World Bank. 2022. *Macro Poverty Outlook*.

<sup>3</sup> Transparency International. 2022. "[Corruption Perceptions Index: 2021](#)."

<sup>4</sup> IMF. 2019. *Republic of South Sudan: Staff Report for the 2019 Article IV Consultation*. p. 9; European Union, Ecorys, VNG International. n.d. "[Tracking the Flow of Government Transfers: Financing Local Government Service Delivery in South Sudan](#)."

<sup>5</sup> World Bank. 2022. [South Sudan Economic monitor: Towards a Job Agenda](#). p. 22.



tariffs. This has been especially acute following the GoSS's harmonization of the unofficial and official exchange rates, the resultant SSP-denominated tariff increases have led to a drop in peak demand in the Juba system from around 30 MW to around 20 MW. The high electricity tariff incentivized potential customers to use their diesel generators and in some cases solar rooftop systems. There are solar PV power plants currently under construction in the outskirts of Juba intended to reduce the cost of electricity supply, but their actual impact on the tariff is unclear.

**9. The sector's legal and institutional framework suffers from significant gaps, and its development has been largely ad hoc as conflict and war derailed sector planning and institution building.** The GoSS has two key institutions in the electricity sector: the Ministry of Energy and Dams (MoED) as the line ministry and South Sudan Electricity Corporation (SSEC) as a state-owned utility under the MoED. While some legal acts and policies, including the South Sudan Electricity Corporation Act (2011) and Electricity Sector Policy (2013), had attempted to define the roles and responsibilities of the institutions, these frameworks lost their relevance due to the loss of grid infrastructure in the country during the civil conflict and increased role played by the private sector. As a result, a mostly ad hoc uncodified institutional framework has emerged that has met some of the short-term needs of a post-conflict environment but that will be difficult to scale and has left the mandates of several public sector institutions ambiguous. In particular, SSEC has been largely sidelined in the day-to-day operation of South Sudan's power sector since most of SSEC's responsibility for sector operation at the utility has been handed over to Juba Electricity Distribution Company (JEDCO). SSEC also has limited financial autonomy, as it is required to transfer most of its revenues to the Ministry of Finance and Planning (MoFP), an arrangement that predates the formation of JEDCO. The lack of financial autonomy made it extremely difficult for SSEC to maintain its assets and adequately remunerate its staff. As a consequence, SSEC has lost many of its staff to the private sector, including to JEDCO and the oil industries. Figure 2 illustrates the gaps between how the sector was meant to operate under the original legal framework and how it operates today.

**10. Private sector played an important role in restoring and improving electricity services in Juba.** JEDCO, which currently manages all operations of the Juba grid, including dispatch, O&M, billing, collections, and to some extent also installing new connections, was established in May 2018 as a joint venture entity between SSEC and Ezra Group (a private South Sudanese company originally from Eretria). The Ezra Group is the majority shareholder of JEDCO and also operates a 32MW generation facility that is supplying power to JEDCO. JEDCO has recruited a large number of SSEC technical staff and is effectively managed by Ezra. SSEC is nominally still responsible for power delivery outside of Juba, but as very little of its remaining infrastructure is currently operational. This concession arrangement has improved the service of electricity and commercial efficiency of the Juba grid which had been suffering from frequent outages and low collection rates. JEDCO reported that its technical/non-technical losses are less than 10%, and the electricity is available more than 95% of the time. These figures represent relatively high level of performance in utilities in the region.

**11. The sector made little investment outside the capital, severely limiting access to electricity by poorer segments of the population.** There has been limited focus on investment in downstream electrification planning, particularly in rural electrification, even though the 2013 South Sudan Electricity Policy highlighted the importance of rural electrification. There is ongoing support by the Government of Egypt to rehabilitate thermal generation units in the cities of Runbek and Yambio, but the distribution network remains dysfunctional. While some private sector players are studying rehabilitation and construction of the isolated grids in the state capitals, they are likely to be financially unviable without public support.

**12. Establishing effective models for public-private partnership (PPP) is key to restoring and enhancing access to electricity services.** Given the extremely weak PFM in the country and continued need for humanitarian support, the electricity sector's access to finance is likely to be limited in the near term. This will severely constrain the sector's capacity to maintain existing assets and remunerate its personnel, let alone making major capital investments. When the PFM and electricity sector reform takes place, the sector will benefit from engaging the private sector to participate, while ensuring transparent competition and providing subsidization, when necessary, to enhance the affordability of electricity services. There is a wealth of experience in the East Africa region to attract private sector investment in isolated grids and stand-alone off-grid access.



13. **In the absence of a national grid, isolated grids and off-grid solutions, with an adequate PPP framework, will play a critical role in enhancing access to electricity in the near term.** The country is unlikely to have major transmission infrastructure in the near term, given the continued conflict at subnational levels, massive investment needs, and limited access to finance. Given such constraints, the most realistic way to enhance electricity access in the country will be through isolated grids and off-grid solutions, in which electricity is generated in geographical proximity to the users. Successes from the PPP in the Juba grid for efficient grid operation could be replicated in other regional capitals, while also incorporating lessons learned. In addition, the significant size of internally displaced people, representing 15–20 percent of the national population, and the dominance of agro-pastoralist livelihood in rural areas suggest the importance of mobile energy solutions such as solar home systems (SHS) to reach these people. The country has a nascent market of such solar solutions, with some local businesses offering SHS with a pay-as-you-go (PAYG) scheme to make such products more accessible.

14. **Electricity access for the delivery of basic public services is critical to address the drivers of fragility.** Lack of access to electricity is one of the key factors constraining social service delivery in the country. Most health and educational facilities outside Juba do not have electricity. Even the high-tier service facilities (for example, state hospitals) with diesel generators have limited electricity service due to the high cost of transporting fuels in rural areas: road infrastructure is far from adequate and the number of government/military checkpoints along major roads makes fuel transport prohibitively expensive and time-consuming. Lack of electricity limits the capacity of public facilities to operate basic medical equipment, store vaccines at adequate temperatures, and provide an advanced educational curriculum. More fundamentally, lack of electricity makes it difficult to retain health care workers and teachers at the facilities.

#### Relationship to CPF

15. **The proposed project's activities are consistent with key objectives of the World Bank Group (WBG) Country Engagement Note (CEN) for South Sudan FY21–23.** While the CEN is not explicit about enhancing access to electricity, the proposed project will contribute to the second focus area to support basic service delivery (focus area 2) and promote resilience and livelihood opportunities (focus area 3). Electrification of public institutions, including health and education, will improve access to basic human development services such as basic and critical services for South Sudanese. It will also provide key input to enhance agricultural productivity to create income opportunities and food security and create opportunities for small businesses outside Juba.

16. **As per the overall direction of the CEN, the project will be implemented by the GoSS, in principle.** This is aligned with the strategic direction to shift the implementation modality away from third-party entities to the Government. However, the success of such government-led implementation critically hinges on (a) strong support from the MoFP to make resources available to build implementation capacity in the energy sector and (b) continued peace at the national level. If these enabling factors are not in place, a third-party implementation may need to be considered. These risks are elaborated on further in the risk section.

17. **The project is also aligned with key WBG corporate strategies.** It will contribute to the WBG Climate Change Action Plan and New Generation Africa Climate Business Plan by adding extra renewable energy capacity, most likely solar, while ensuring the resilience of the investment to climate change impacts such as floods. It will also contribute to 'Maximizing Finance for Development' by leveraging private sector finance for the isolated grid and off-grid electrification and by seeking a collaboration with International Finance Corporation (IFC) and Multilateral Investment Guarantee Agency (MIGA). The project will also identify options to contribute to the WBG Gender Strategy during project preparation.

18. **The project is also aligned with the Revised National Development Strategy (R-NDS) 2021–2024,** which articulated the key role of the infrastructure cluster to delivering on development goals in the NDS, including those regarding education, health, security, job creation, and the environment. Specifically for the electricity sector, the NDS highlighted the need for improving energy supply across all 10 states through PPPs and the development of renewable energy resources.



### C. Proposed Development Objective(s)

19. The Project Development Objective (PDO) is to increase access to electricity services and strengthen the institutional capacity of electricity sector in South Sudan

#### Key Results (From PCN)

20. The following are the key preliminary PDO indicators, which will also be gender-disaggregated:

- Number of people provided with new or improved access to electricity service
- Number of public institutions provided with new or improved electricity service
- Improved capacity of the electricity sector (exact indicator to be determined).

### D. Concept Description

21. **The design of the proposed project is based on ongoing advisory services and analytics (ASA) work.** The ASA, Pathways to Electricity Access Expansion in South Sudan (P175227), 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 proposed project relies on data gathered and the analysis conducted through the ASA to outline potential areas for financing support as well as capacity building and technical assistance.

22. **The current set of project activities represents a long list of options, which will be shortened and simplified.** Currently, the proposed project has three components with a range of potential subcomponent activities: (1) Isolated grid development and densification; (2) Off-grid electrification through stand-alone solar systems; (3) Technical assistance, institutional capacity building, and implementation support. During project preparation, a limited number of activities will be selected based on their technical feasibility, economic efficiency, agility in the context of FCV, and available funding envelope.

23. **The project will aim to scale the decentralized PPP model for the provision of electricity services in the sector.** Private sector participation is expected in the investment/operationalization of decentralized isolated grids in state capitals. Appropriate PPP models will also be explored to support the access to electricity for the poor population and/or IDPs in the outskirts of Juba, taking advantage of the presence of the grid infrastructure. The project will also support communities outside Juba and state capitals, with a focus on facilitating critical public facilities, large refugee/host community settlements, and the market for household/productive systems, with the potential engagement of the private sector.

#### Component 1: Isolated grids development and densification

24. Under this component, several options for grid-based electrification will be explored. The subcomponents listed below can be shortened during the project preparation.

25. **Subcomponent 1.1: Development of isolated grids in selected regional cities.** The project could finance the rehabilitation and development of isolated grid systems in a subset of South Sudan's nine regional capital cities (Wau, Malakal, Yambio, Aweil, Bor, Kuajok, Torit, Rumbek, and Bentiu). The selection will be based on technical, economic, and social selection criteria. Approximately 750,000 people, or 7 percent of the national population, are estimated to live in these cities. A geospatial analysis, carried out under the ongoing ASA, identified these cities as strong candidates with a significant concentration of potential electricity demand to be supplied with isolated grids in a relatively cost-effective manner. These cities host critical public facilities, including hospitals, primary and secondary schools, and public buildings, as well as key economic hubs such as



agricultural markets. Additional sites outside the regional capital can also be considered if significant demand is identified. The isolated grids are expected to be powered by a combination of rehabilitated diesel generation, solar PV, and batteries.

26. Effective models for PPP will be explored to ensure the operational efficiency of the isolated grids while ensuring the affordability of electricity. Potential PPP models include a concession model under which the public sector finances the infrastructure and engages the private sector for the operation and bill collection. Alternatively, the Government could launch a minimum tender subsidy model under which the private sector developers compete for the right to receive subsidies to invest in the isolated grid. The models will be discussed in detail with the MoED and other key counterparts during project preparation.

27. Under this subcomponent, electrification of communities at borderland will also be explored. While the communities near the border with Uganda (Central Equatoria State and Eastern Equatorial State) do not have access to electricity, the MoED made an arrangement with the Government of Uganda to extend its distribution line to South Sudan. The distribution lines have already been extended to the towns of Nimule (1,750–2,000 connections ) and Kaya (<500 connections), and further extension is expected to the town of Kajo Keji in the future. Once the Power Purchase Agreement (PPA) with Uganda is signed, the MoED intends to connect users to deliver electricity to these communities through JEDCO. As in the case of Juba, electricity users are ultimately expected to bear the cost of connections, which may be difficult for many to afford. The project could either directly finance such last mile connections or support a grid connection subsidy scheme to reimburse the cost of connections.

28. **Subcomponent 1.2: Juba grid densification.** Juba’s grid is the only functional grid in the country which has been rehabilitated through the AfDB-financed project and is currently operated by JEDCO. It serves approximately 30,000 customers. However, there is a significant number of potential users, primarily households, that are not yet connected to the grid, inside and on the outskirts of the city. It is estimated that there are 16,000 unconnected potential customers, of which 10,000 can be connected using existing transformers. Many of these customers are estimated to be internally displaced people from elsewhere in the country due to conflict. While JEDCO intends to take commercial loans for this purpose, grid customers are ultimately responsible for paying the connection cost. The project could either directly finance such grid densification or institute a grid connection subsidy scheme to reimburse the cost of connections. The detailed mechanism will be determined during the project preparation. Such investment to connect more customers to the Juba grid also helps address the risk of oversupply in the Juba grid, which has 40 MW of solar capacity under construction and a solar IPP in the pipeline, in addition to the existing 33 MW thermal capacity, against recent peak demand of around 20 MW. In parallel, options to lower the retail tariff in the Juba grid will also be explored.

29. **Subcomponent 1.3: Electrification of refugee camps and host communities.** South Sudan hosts about 330,000 refugees, most of whom are in Jam Jang in the Ruweng Administrative Area and Maban in Upper Nile State, both near the northern border with Sudan. Seven camps (Doro, Ajuong Thok, Pamir, Kaya, Yida, Gendrassa, and Batil) exist and are supported by United Nations High Commissioner for Refugees (UNHCR). Most refugees are from Sudan, and given the continued political instability in the region, there are limited prospects for them to return to their place of origin soon. In these refugee camps, only key public facilities as well as host community government buildings are served by electricity through UNHCR’s diesel-powered generator sets. The rest of the community, like the majority of South Sudanese, does not have electricity.

**Table 1. Summary of Two Major Refugee Camps and Host Communities in South Sudan**

	No of Camps	Refugee Population (thousands)	Host Community Population (thousands)	Total Population (thousands)	Total No. of Households (thousands)
Jam Jang	3	127	100	227	50
Maban	4	179	70	249	54
<b>Total</b>	7	306	170	476	104

Source: UNHCR.

Note: Household size of 4.6 per household assumed.





30. The size and geographical concentration of refugees and host communities represent an opportunity for electrification. Within each settlement cluster, the camps are in geographical proximity, which may enable economies of scale by sharing the same power generation facility or product distribution centers. Geospatial analysis carried out as part of the World Bank’s ASA also confirms the viability of these settlements through isolated grids, which can serve both refugees and host community households and businesses and public institutions, potentially with cross-subsidy arrangements depending on the user types. Both isolated grids and off-grid electrification interventions will be explored during the project preparation.

## Component 2: Off-grid electrification through stand-alone solar systems

31. **Subcomponent 2.1: Electrification of public institutions.** The ongoing ASA identified specific locations of approximately 7,000 health and educational facilities in South Sudan, most of which are located outside major cities and therefore unlikely to be supplied by grid services soon. This component could finance the delivery of solar and battery-based off-grid energy solutions for selected public institutions, with priority for Payam-level health care centers (PHCCs) and secondary schools, which require more electricity for their service delivery than facilities at lower tiers. Other public facilities such as government administration buildings and publicly shared water supply facilities can also be supported. During project preparation, selection of the beneficiary facilities and technical assessment to quantify the energy needs and gaps of the public facilities will be made. The systems will likely consist of solar PV and batteries; the alternative of diesel generation is likely to be prohibitively expensive given the logistical cost of transporting the fuel to rural areas, including the cost of going through government/military checkpoints. Options for sustainable O&M mechanism will be explored during project preparation.

32. **Subcomponent 2.2: Pilot of household and productive use of stand-alone solar systems.** This subcomponent could finance pilot expansion of off-grid solar solutions, including solar lanterns, SHS for households, and solar-based productive use systems such as solar water pumping and refrigeration systems. Such systems are expected to be used by households, smallholder farmers, and small businesses in the areas where service from isolated grids is not available, as well as by pastoralists and IDPs that may not be settling in permanent locations. While more market intelligence on such solar solutions will be available as part of the ongoing ASA, a preliminary survey suggests that the country has several existing businesses that are piloting PAYG models but still facing affordability challenges by potential customers. Results-based financing (RBF) could be used to lower consumer prices and make off-grid solutions more affordable. Such an RBF facility would be coupled with an upfront grant to distributors (to address the lack of access to finance), product quality requirements, and business capacity development. The RBF facility will be managed by a specialized fund management consultancy to issue the call for proposals, evaluate proposals, and verify the results of the RBF recipients.

**Table 2. Indicative List of Stand-Alone Solar Systems for Household and Productive Use**

Technologies	Description
Tier 1 solar lanterns	Solar lanterns less than 10 Wp. Typically cost US\$10–20 and are portable. They provide one light source and can charge a mobile telephone.
Tier 2–Tier 4 SHS	SHS between 10 and 350 Wp. Typically cost up to US\$120 and are portable. They operate multiple light sources and charging points which may include for televisions, fans, and other basic appliances.
Solar-powered appliances	These are solar-powered and energy-efficient appliances such as fans, refrigerators, and televisions which can either be direct drive (powered separately through a stand-alone solar PV system) or connected to the SHS.
Productive uses leveraging solar energy (PULSE) such as solar water pumps	These are stand-alone productive use systems tailored to the needs of the consumers.



**Component 3: Technical assistance, institutional capacity building, and implementation support**

33. **Subcomponent 3.1: Regulatory framework for the overall sector and isolated grids.** This subcomponent will strengthen the regulatory framework of the energy sector, including that of decentralized and isolated grids. The MoED will engage technical and legal experts to prepare a draft framework for formal adoption by relevant authorities. Specifically, it will support the revision/update of the 2011 South Sudan Electricity Corporation Act and 2015 National Electricity Bill. These revisions are key to clarify the institutional mandate of sector institutions and potentially establish a sector regulator.

34. In addition, this subcomponent will also include technical assistance to the MoED to establish a PPP framework to effectively attract and regulate private sector players in the investment and operation of the electricity sector, including in isolated grids.

35. **Subcomponent 3.2: Electricity Sector Master Plan.** The plan will cover generation, transmission, distribution, and electrification. It will also consider regional interconnection opportunities with members of the EAPP, GoSS’s Nationally Determined Contributions on climate change, and financial and macroeconomic constraints. Preparation of the plan will be sequenced to ensure that key strategic outputs are made available to the MoED at an early stage.

36. **Subcomponent 3.3: SSEC Business Plan Development.** The subcomponent will support analytical and advisory work to define the role of SSEC in the sector and its strategic direction. An SSEC human resource plan will also be developed as a part of the plan to ensure adequate staffing and capacity, including staff retention strategies for high performers.

37. **Subcomponent 3.4: Support for the Project Implementation Unit (PIU) and capacity building.** The 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, and environmental and social safeguards.

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

Summary of Screening of Environmental and Social Risks and Impacts

38. 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 also 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. 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 Vegetation/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 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 from manufacturing, installation, and maintenance to decommissioning and recycling. The transportation of materials and machinery may lead to increase in traffic congestion and road accidents. uncontrolled growth of tall trees or vegetation within the transmission RoW may aggravate and cause an increased risk of electrocution, due to contact of branches and trees with live distribution lines which creates, ignition of forest and brush fires that ultimately danger to workers who are on duty, accidental fire may be caused by trees falling on distribution network cables, improperly stored/handled fuel and overheating of battery banks. Diesel generators, vehicles, and construction machineries activities can cause an increase in the noise levels which can affect project workers and the communities residing near the project sites. The risk of adverse consequences posed by the nature and use of the structural elements; risks associated with safety of services which may result in electric shock from electrical cabinets or cables; potential traffic and road safety risks to workers, affected communities, and road users throughout the project life cycle may present danger and could be critical for community health and safety, particularly for women and children and other vulnerable groups. 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 as major contextual risks including the limited capacity of Ministry of Energy and Dams, the environmental risk of the project is rated as substantial.

39. 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, accessibility of sub projects for monitoring and support, proper utilization, and implementation of Project's environmental and social risk management tools.

40. 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 that are assigned to Component 1 of the



Project. 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 and Sexual exploitation and harassment risks in South Sudan. Hence, the social risk of the project is rated as substantial.

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## APPROVAL

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**Approved By**

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