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R2019-0138/1

June 10, 2019

Closing Date: Thursday, June 27, 2019
at 6:00 p.m.

FROM: Vice President and Corporate Secretary

Eswatini - Network Reinforcement and Access Project

Project Appraisal Document

Attached is the Project Appraisal Document regarding a proposed loan to Eswatini for a Network Reinforcement and Access Project (R2019-0138/1), which is being processed on an absence-of-objection basis.

Distribution:
Executive Directors and Alternates
President
Bank Group Senior Management
Vice Presidents, Bank, IFC and MIGA
Directors and Department Heads, Bank, IFC, and MIGA

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Report No: PAD3285

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF EUR 35.7 MILLION
(US$ 40.0 MILLION EQUIVALENT)

TO THE

KINGDOM OF ESWATINI

FOR A

NETWORK REINFORCEMENT AND ACCESS PROJECT

MAY 23, 2019

Energy and Extractives Global Practice
Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective April 30, 2019)

Currency Unit =		EUR, US$, the Lilangeni (SZL)
EURO 0.89190153	=	US$1
SZL 14.5241 =		US$1

FISCAL YEAR
January 1 - December 31

Regional Vice President:	Hafez M. H. Ghanem
Country Director:	Paul Noumba Um
Senior Global Practice Director:	Riccardo Puliti
Practice Manager:	Wendy E. Hughes
Task Team Leaders:	Joseph Mwelwa Kapika, Samuel Kwesi Ewuah Oguah

ABBREVIATIONS AND ACRONYMS

ABC	Aerial Bundled Conductor
CAPEX	Capital Expenditure
CERC	Contingency Emergency Response Component
CMA	Common Monetary Area
CPF	Country Partnership Framework
CPS	Country Partnership Strategy
DoE	Department of Energy
EEC	Eswatini Electricity Company
EIRR	Economic Internal Rate of Return
ESCP	Environmental and Social Commitment Plan
ESERA	Eswatini Energy Regulatory Authority
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EU	European Union
FM	Financial Management
FNPV	Financial Net Present Value
GBV	Gender-based Violence
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GoKE	Government of the Kingdom of Eswatini
GRM	Grievance Redress Mechanism
HR	Human Resource
HV	High Voltage
IBRD	International Bank for Reconstruction and Development
IFR	Interim Financial Report
IPF	Investment Project Financing
IPP	Independent Power Producer
KVA	Kilovolt-Ampere
LMP	Labor Management Plan
M&E	Monitoring and Evaluation
MFD	Maximizing Finance for Development
MNRE	Ministry of Natural Resources and Energy
MoEPD	Ministry of Economic Planning and Development
MoF	Ministry of Finance
MPCU	Micro-Projects Coordination Unit
MV	Medium Voltage
NEP	National Energy Policy
NPV	Net Present Value
O&M	Operations and Maintenance
OPGW	Optical Ground Wire
PAREE	Program Framework for Affordable Renewable Energy in Eswatini

PDO	Project Development Objectives
PIU	Project Implementation Unit
PLR	Performance and Learning Review
PPSD	Project Procurement Strategy for Development
PSC	Project Steering Committee
RAP	Resettlement Action Plan
RDF	Regional Development Fund
REF	Rural Electrification Fund
REP	Rural Electrification Program
RES	Rural Electrification Section
REU	Rural Electrification Unit
RPF	Resettlement Policy Framework
RSSC	Royal Swazi Sugar Corporation
SACU	Southern African Customs Union
SAPP	Southern African Power Pool
SCADA	Supervisory Control and Data Acquisition
SEA	Sexual Exploitation and Abuse
SEP	Stakeholder Engagement Plan
SHEQ	Safety, Health and Quality
ENAP	Eswatini National Aids Programme
SORT	Systematic Operations Risk-rating Tool
US$	United States Dollar
US¢	United States Cents
USL	Ubombo Sugar Limited
WTP	Willingness to Pay

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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Eswatini	Network Reinforcement and Access Project	
Project ID	**Financing Instrument**	**Environmental and Social Risk Classification**
P166170	Investment Project Financing	Moderate

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[✓] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[ ] Fragile State(s)
[ ] Disbursement-linked Indicators (DLIs)	[✓] Small State(s)
[ ] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[ ] Responding to Natural or Man-made Disaster
[ ] Alternate Procurement Arrangements (APA)	

Expected Approval Date	Expected Closing Date
27-Jun-2019	31-Oct-2024

Bank/IFC Collaboration

No

Proposed Development Objective(s)

To improve the reliability of electricity supply and increase access to electricity services in targeted areas of the Borrower.

Components

Component Name	Cost (US$, millions)

Reinforcement of the Transmission and Distribution Grid	31.00
Electricity access expansion	12.00
Analytical Support and Capacity Building	2.00
Contingency Emergency Response Component	0.00

Organizations

Borrower:	Kingdom of Eswatini
Implementing Agency:	Eswatini Electricity Company

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	45.00
Total Financing	45.00
of which IBRD/IDA	40.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	40.00

Non-World Bank Group Financing

Counterpart Funding	5.00
Borrowing Agency	5.00

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2019	2020	2021	2022	2023	2024	2025
Annual	0.00	1.00	4.00	6.52	9.08	13.24	6.15
Cumulative	0.00	1.00	5.00	11.52	20.60	33.85	40.00

INSTITUTIONAL DATA

Practice Area (Lead)

Energy & Extractives

Contributing Practice Areas

Climate Change and Disaster Screening

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

Gender Tag

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

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

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

COMPLIANCE

Policy

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

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

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

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

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

Legal Covenants

Sections and Description

Loan Agreement
Section I.A.1 of Schedule 2 - By no later than one (1) month after the Effective Date, the Borrower, through MNRE, shall establish and thereafter maintain, at all times during the implementation of the Project, a Project steering committee, with a mandate, terms of reference, composition, and resources satisfactory to the Bank.

Sections and Description
Loan Agreement
Section I.B.1 of Schedule 2 - To facilitate the carrying out Parts 1, 2 and 3 of the Project, the Borrower shall make the proceeds of the Loan available to the Project Implementing Entity on an on-lending basis for Part 1 of the Project and an on-granting basis for Parts 2 and 3 of the Project, under a subsidiary agreement between the Borrower and the Project Implementing Entity, under terms and conditions approved by the Bank

Sections and Description
Loan Agreement
Section I.C. of Schedule 2 - By no later than one (1) month after the Effective Date, the Borrower shall: (a) adopt and thereafter maintain throughout the implementation of the Project, a Project implementation Manual in a manner satisfactory to the Bank; (b) cause the Project Implementing Entity to adopt, and thereafter maintain throughout the implementation of the Project, the Project Implementation Manual in a manner satisfactory to the Bank

Sections and Description
Loan Agreement
Section I.D.2 of Schedule 2 – The Borrower shall, and shall cause the Project Implementing Entity to ensure that the Project is implemented in accordance with the Environmental and Social Commitment Plan in a manner acceptable to the Bank.

Sections and Description
Loan Agreement
Section I.E. of Schedule 2 – The Borrower shall prepare and furnish to the Bank for its review and approval, an operations manual which shall set forth detailed implementation arrangements for the CERC Part, promptly adopt such operations manual for the CERC Part and ensure that the CERC Part is carried out in accordance with the IRM operations manual.

Sections and Description
Project Agreement
Section I.B.4. of Schedule - By no later than November 30th of each calendar year, the Project Implementing Entity shall prepare and furnish to the Bank, an annual program of activities proposed for implementation under the Project during the following Fiscal Year, together with a proposed budget.

Sections and Description
Project Agreement
Section I.C.2 of Schedule – The Project Implementing Entity shall ensure that the Project is implemented in

accordance with the Environmental and Social Commitment Plan in a manner acceptable to the Bank.

Conditions

Type	Description
Effectiveness	Section 5.01 of Article V of the Loan Agreement - The Additional Condition of Effectiveness consists of the following: the Subsidiary Agreement has been executed by the Borrower and the Project Implementing Entity, in accordance with Section I.B of Schedule 2 to this Agreement.
Type	Description
Disbursement	Section III.B.1(b) of Schedule 2 to the Loan Agreement - No withdrawal shall be made: under Category (4), for Emergency Expenditures, under Part 4 of the Project, unless and until the Bank is satisfied, and notified the Borrower of its satisfaction, that all of the CERC conditions have been met.

I. STRATEGIC CONTEXT

A. Country Context

1. **The Kingdom of Eswatini[1] (Eswatini) is a small open economy in Southern Africa with a land area of 17,364 km^2 and a population of 1.2 million.** The country is largely mountainous, bordered by Mozambique and South Africa. Approximately 76 percent of the population live in rural areas. Eswatini is closely linked to South Africa and depends on it for about 85 percent of imports and about 60 percent of exports.

2. **The King, as Head of State, holds supreme executive, legislative, and judicial powers.** Eswatini has been independent since 1968. The country defines itself as a 'monarchial democracy', where both parliamentary and traditional systems of governance run concurrently. The Prime Minister, appointed by the King, is Head of Government and chairs the Cabinet. The King also appoints 10 of the 76 members of the House of Assembly (the lower house of Parliament) and 20 of the 31 members of the Senate (upper house of Parliament). Parliamentary elections were last held in September 2018 and the new administration is yet to implement any major policy shifts.

3. **Eswatini is a member of the Common Monetary Area (CMA) with South Africa, Lesotho and Namibia. Its domestic currency, the Lilangeni (SZL),[2] is pegged at parity with the South African currency, the Rand,** which is also legal tender in the country. The CMA provides a nominal anchor to monetary policy and facilitates capital and commercial transactions with South Africa. The country's inflation generally mirrors that in South Africa.

4. **With a Gross Domestic Product (GDP) per capita of approximately US$3,000, Eswatini is classified as a lower middle-income country.** The economy is largely driven by agriculture-based exports and this sector employs over 70 percent of the population[3]. Sugar is the single largest earner of foreign exchange, contributing up to 20 percent of GDP in 2017. This, combined with other industries producing wood pulp, edible concentrates, and canned fruit, accounted for 39.5 percent of GDP in the same year. Despite the large agrarian population, much of the farming is subsistence and results in low productivity. Agriculture (without the sugar industry) contributed 7.3 percent to GDP in 2016 and the Government of the Kingdom of Eswatini (GoKE) seeks to boost the sector through commercialization and intensification of agriculture.[4]

5. **Eswatini is also a member of the Southern African Customs Union (SACU) that includes Botswana, Lesotho, Namibia, and South Africa.** SACU members share a common external tariff policy, freely exchange their goods internally and distribute among themselves the pool of customs and excise taxes collected by the union. For the 2018/19 fiscal year, SACU receipts are expected to account for 34 percent of the country's total revenue and grants as compared to 43 percent in the previous period as growth in South Africa, the main contributor to the SACU revenue pool, remains moderate, while domestic spending pressures rise.[5]

[1] Kingdom of Swaziland until May 11, 2018
[2] US$ 1 ≈ SZL 14.5
[3] United States Department of Agriculture (Swaziland agricultural economic fact sheet)
[4] FAO (2016)
[5] IMF (2017): Country Report No. 17/274

6. **The fiscal consolidation efforts that commenced in 2018 did not result in the expected reduction of the fiscal deficit.** The budget deficit is estimated at 5.7 percent of GDP in 2018 up from 4.8 percent in 2017, due to an 18 percent year-on-year decline in SACU receipts. As a result, suspension of most capital projects, a civil service wage freeze in 2018, and other fiscal consolidation measures introduced on November 22, 2018 did not lead to a fiscal deficit reduction. The Government continued to accumulate domestic arrears and partly financed the fiscal deficit through running down of international reserves. Consequently, gross official reserves dropped to the lowest level in five years, reaching 2.9 months of import cover in December 2018 (below the three-month international benchmark). The current account surplus narrowed, driven by higher import growth that resulted in a trade deficit in 2018. Public debt increased by over 3 percentage points of GDP (year-on-year), reaching 23.8 percent of GDP in December 2018. At this pace of increase, public debt may breach the Government's medium-term threshold of 35 percent of GDP by 2021.

7. **Eswatini's fiscal stance is estimated to have limited economic growth in 2018 and undermined medium-term prospects.** The modest fiscal adjustment, which included suspension of some government capital projects affected the construction sector, while the wage freeze constrained demand, negatively affecting growth of the wholesale and retail sectors in particular. Further, domestic arrears negatively affected private sector business, particularly those that rely on government payments such as for construction activities. As a result, growth is estimated to have averaged 0.5 percent in 2018 from 1.9 percent in 2017. In the absence of stronger efforts at fiscal consolidation and structural reforms, economic growth will likely be constrained in the medium-term.

8. **Poverty inequality and unemployment remain the most stubborn primary development challenges for Eswatini and overcoming these is a Government priority.** Poverty levels have remained unchanged over the last five years, with approximately 40 percent of the population estimated to be living under the international US$ 1.90 poverty line. Furthermore, it is estimated that 60 percent of the population is poor overall. Income inequality is also high, with an estimated Gini coefficient of 0.51 in 2009/10 which may have worsened due to the absence of pro-poor growth to date.

9. **Development outcomes are hindered by the high HIV prevalence** rate estimated at 27.2 percent (female: 32.5 percent, male 20.4 percent). Consequently, life expectancy fell to 46 years in 2004, but has since rebounded and in 2015 reached 58.9 years.

10. **Agriculture has the potential to reduce poverty and promote shared prosperity, provided the requisite investments are made.** The Government is supporting improved agricultural productivity through schemes that allow smallholders to coordinate and engage in commercial-scale production. The principal focus has been on sugar cane production and the approach is being piloted for other commercially viable products including horticulture.

B. Sectoral and Institutional Context

11. **The Ministry of Natural Resources and Energy (MNRE) is responsible for policy formulation and has overall oversight over the electricity supply industry in Eswatini.** In 2018, the MNRE promulgated the National Energy Policy 2018 (NEP 2018). The policy sets out five objectives: (a) Ensuring access to modern energy services for all; (b) Enhancing employment creation; (c) Ensuring security of energy supply; (d) Stimulating economic

growth and development; and (d) Ensuring environmental and health sustainability. To achieve these objectives, the NEP 2018 has 11 policy positions for the electricity sector (table 1).

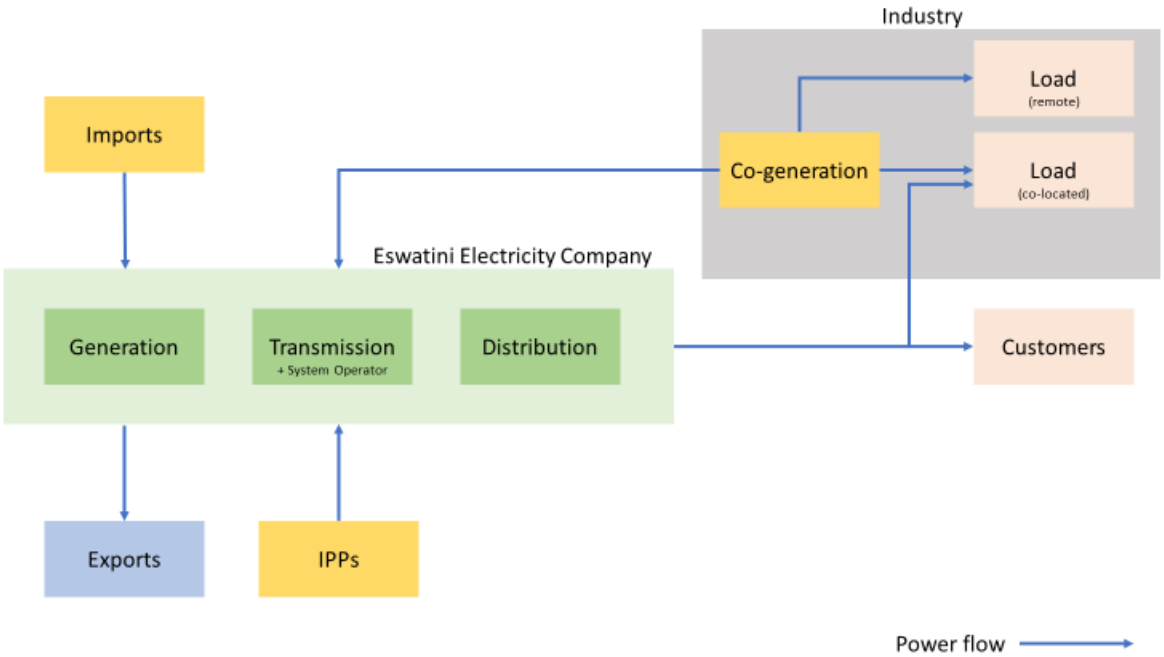
Table 1. Electricity Policy Positions (NEP 2018)

No.	*Policy Position*
1.	To ensure adequate security of electricity supply.
2.	To ensure efficient and cost-effective electricity supply integrating pricing for economic efficiency and financial sector viability.
3.	To support the development of renewable energy resources for a target of 50percent of the electricity generation mix.
4.	To plan and support a comprehensive development of national capacities for the development of renewable energy projects.
5.	To strive to provide all households with access to modern energy by 2022.
6.	To strive to ensure eradication of energy poverty at all levels by 2030.
7.	To ascertain options and ensure establishment of a national electricity fund in support of renewable energy and accelerating access to modern energy throughout the country.
8.	To ensure the launch and implementation of a National Energy Efficiency Policy and associated implementation strategy covering all relevant sectors of the economy.
9.	To facilitate the further liberalization of the electricity market.
10.	To facilitate the access of independent power producers (IPPs) in the electricity market through an effective regulatory framework.
11.	To ensure that appropriate local standards are established for relevant renewable energy and energy efficiency technologies to enhance ease of trade and ensure safe and relevant quality to the consumers.

12. **The electricity supply industry is regulated by the Eswatini Energy Regulatory Authority (ESERA), established by the Energy Regulatory Act (2007).** The core mandate of ESERA includes the issuance of licenses for power generation, transmission, system operation, distribution, supply, import, and export. ESERA is also responsible for power system planning, electricity pricing, as well as the development and enforcement of quality of service and supply standards.

13. **The state-owned and vertically integrated Eswatini Electricity Company (EEC) is the national utility of Eswatini.** EEC has an installed generation capacity of approximately 70MW that is dominated by hydropower from the Maguga (19.8 MW), Ezulwini (20 MW), Edwaleni (15 MW), and Maguduza (5.6MW) power stations. The balance of EEC's installed capacity of 9 MW is provided by two diesel-fired units at Edwaleni that are currently mothballed due to high operating costs. Utilizing bagasse, the sugar industry owns and operates by comparison, significant co-generation facilities that provide electricity to its factories and associated communities. Total sugar industry co-generation capacity is 107 MW comprising 41.5 MW and 65.5 MW at Ubombo Sugar Limited (USL) and Royal Swazi Sugar Corporation (RSSC), respectively. In addition to its own use, USL sells a portion of the electricity it generates to EEC. In 2017, USL sold 54 GWh of electricity to EEC, accounting for about 4.5 percent of total energy sent out by the utility company. The structure of the Eswatini electricity supply industry is illustrated in Figure 1.

Figure 1. Eswatini Electricity Supply Industry[6]



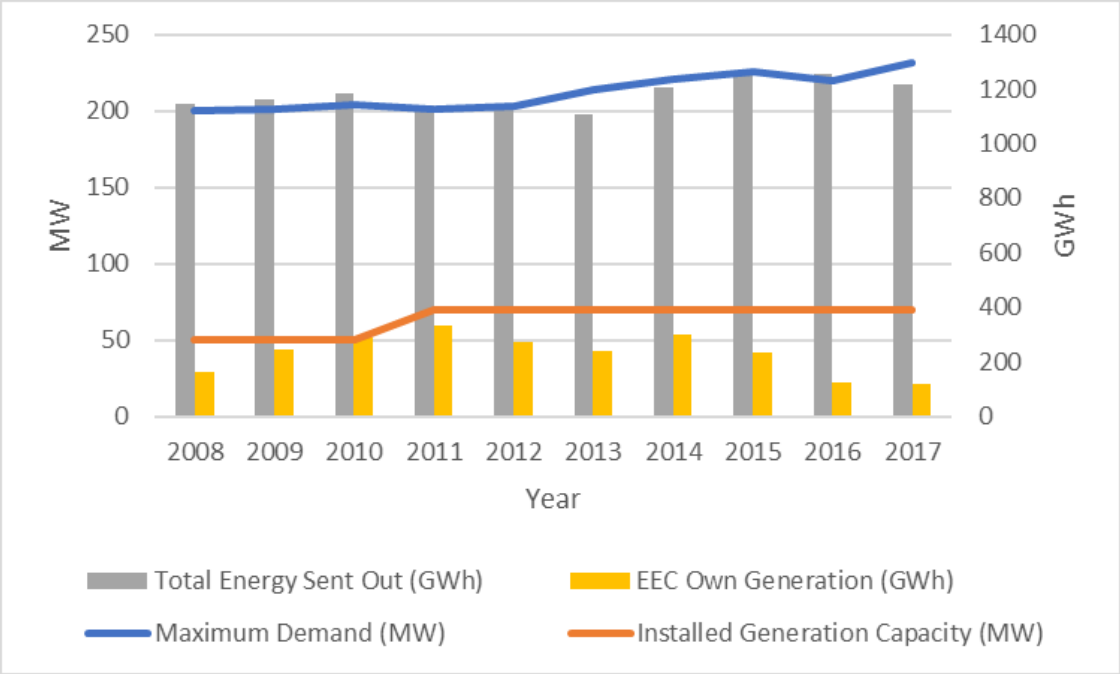
Source: World Bank

14. **Domestic generation is insufficient to meet national demand and therefore Eswatini is a net importer of electricity.** This is compounded by the inability, due to hydrology and the lack of water storage, of EEC's hydro power stations to provide base load power, resulting in significant variations in annual domestic generation output. In 2017, peak demand was 232 MW[7] indicating a capacity shortfall of approximately 170 MW. In 2016 and 2017, local generation output was adversely affected by an El Niño-induced drought, the worst in 30 years. The drought reduced hydro-power production to 123 GWh and 119 GWh for FY-2016 and FY-2017, respectively, which was only about 10 percent of total energy sent out (Figure 2). Emphasizing the dependence on imports, over 2008 – 2017, EEC generation peaked in 2011 when local generation contributed 29 percent[8] to the national requirements.

15. **South Africa is the main source of electricity imports, with the balance obtained from the Southern African Power Pool (SAPP)[9] market.** The lack of diversified sources of supply reduces supply security. The GoKE therefore seeks to reduce its reliance on imports as a means of stabilizing the cost of supply but also recognizes that harnessing domestic resources should not undermine the benefits of electricity trade facilitated by existing interconnections with Mozambique and South Africa. An optimal balance will keep the cost of supply at an efficient level as Eswatini benefits from low off-peak prices on the SAPP day-ahead market for example.

[6] As of 2018, there were no IPPs in Eswatini.
[7] Excludes demand at USL and RSSC.
[8] Excluding USL and RSSC supplies.
[9] Imports from Mozambique have been temporarily suspended because it is less competitive compared with other sources.

Figure 2. Electricity Supply/Demand Balance



Source: World Bank, with data from EEC Annual Reports 2009 - 2017

16. **Tariff increases granted by ESERA have helped support the financial health of EEC, which compares favorably among regional peers.** The company has declared profits since 2013 and despite the adverse impact of the El Niño-induced drought, it reported a balance on cash and cash equivalents of SZL37 million (equivalent to US$2.6 million) in financial year 2016/17.[10] As of October 2018, the domestic consumer tariff was equivalent to US¢12 per kWh following an average tariff increment of 15 percent granted by ESERA for financial years 2017/18 and 2018/19 under a Multi-year Price Determination (MYPD). EEC has also taken advantage of the lower prices on the SAPP market to reduce the overall cost of supply. For example, energy from the SAPP market increased to 6 percent of the country's electricity needs in FY 2016/17 compared to 1 percent in the previous fiscal year.

17. **The technical and operational performance of EEC also compares favorably with regional peers in some key areas.** EEC has one of the lowest transmission and distribution losses in the region, as well as one of the most efficient utility staffing levels across Sub-Saharan Africa.[11] Transmission and distribution losses in 2017 were reported at 2.87 percent and 11.34 percent, respectively.

18. **Eswatini has made significant progress toward its stated goal of universal access by 2022.** In 2003, only 5 percent of the population had access to electricity and by 2017 this had risen to 75 percent. This is in large part due to the Rural Electrification Program (REP) that is integral to the GoKE's Vision 2022 national development

[10] EEC Annual report 2016/2017
[11] Kojima, Trimble, Arroyo and Mohammadzadeh (2016)

strategy that aims for Eswatini to attain 'developed' country status by 2022. The REP has two main sources of funding: (a) direct national budget appropriations to MNRE and the Regional Development Fund (RDF) under the Ministry of Tinkhundla Administration; and (b) grants from cooperating partners including Taiwan, China, and the European Union (EU) which has supported the Micro Projects Program under the Ministry of Economic Planning and Development (MoEPD). These sources together provide approximately SZL220 million (about US$ 16 million) per year toward the REP with the Micro Projects Program being the largest contributor (approximately 44 percent).

19. **However, funding gaps currently estimated at SZL800 million across the country remain and there is a backlog of requests for connections at the MNRE.** Given the significant progress made with increasing electricity access, the Micro Projects Program is increasingly focused on other sectors of the economy. Thus, the Rural Electrification Fund (REF) that has been capitalized since April 2017 through a levy on electricity tariffs will help cover part of the remaining access deficit. This will include consideration of the deployment of off-grid solutions where grid extensions are not economically feasible. The MNRE is currently working on operationalizing the REF.

20. **The REP has resulted in an almost three-fold increase in EEC's household consumers, from 59,600 in 2008 to 167,000 in 2017**. Over the same period, aggregated non-household consumer growth has remained flat (Figure 3) even though the agricultural sector experienced a growth of 28 percent from 2008 to 2017. In the same period, energy consumption by households has risen 40 percent. This is also reflected in consumption by the household sector. Previously, this was the second largest consumer category, by consumption, and has since 2016 become the largest (Figure 4).

Figure 3: EEC Household and Non-Household Consumers

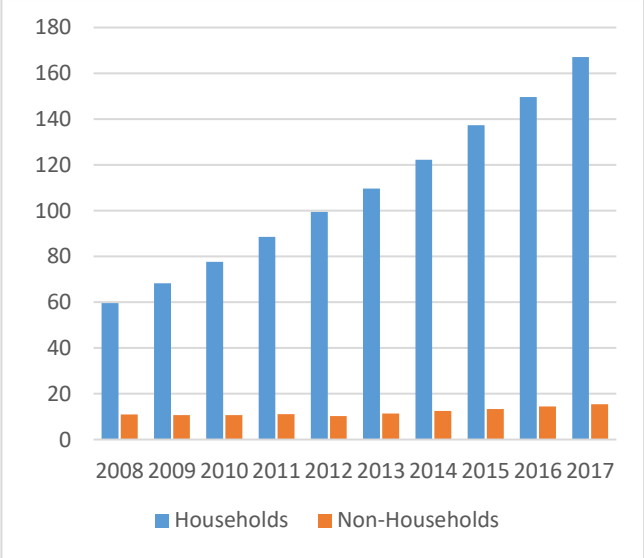
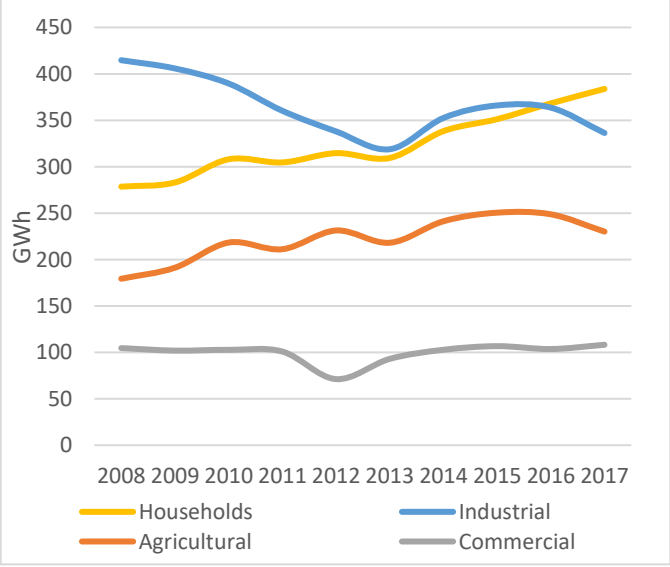


Figure 4: EEC Sales by Consumer Category



Source: World Bank, with data from EEC Annual Reports 2009 - 2017

21. **The REP has been successful in shielding EEC from the onerous burden of financing connections to the grid.** The standard connection charge for domestic consumers is SZL152 (≈US$10) plus a prepayment administration fee of SZL165 (≈US$11). In addition, new consumers are required to pay for any network extensions and reinforcements necessary to enable the connection which presents a significant hurdle for potential rural consumers. Under the REP, potential rural consumers that reside near one another can submit a joint connection application (group scheme application). Once such application has been tested for cost-effectiveness, and funding is available, the REP finances the cost of service provision, including network extensions, service cables and meters. The consumers remain responsible for settling the connection charge and an administration fee. The Rural Electrification Unit (REU) in EEC acts as the liaison between the utility and the funding sources, and coordinates the requests for applications, preparation of quotations, and overall implementation.

22. **Although national access has increased from 5 percent in 2003 to 75 percent in 2017, there are variations across the country's regions.** Eswatini is divided into four administrative regions – Hhohho, Lubombo, Manzini, and Shiselweni. Based on the most recent multiple-indicator cluster survey, Shiselweni is the region with the lowest electricity access rate at 48 percent, followed by Lubombo at 66 percent.[12] Inadequate access to reliable electricity services limits productivity in the region including the potential for improved agricultural output and agro-processing. Increasing the access rate in Shiselweni is therefore a priority for GoKE and is aligned with the goal of achieving universal access by 2022.

23. **Electricity demand growth, largely driven by the REP is placing a strain on existing grid capacity and compromising quality and reliability of supply.** In the Shiselweni region, the existing network has limited capacity to deliver the power needed to meet current and potential demand reliably. At present, the region is served by an 11kV distribution network that runs from the bulk supply point at Nhlangano II substation to Lavumisa, approximately 90km away. This is the longest 11kV feeder in Eswatini and its length and current loading results in poor quality of service characterized by low voltages, frequent power outages and high technical losses. In 2018, a total of 1,016 outages were recorded on the medium and high voltage (HV) network in Shiselweni with a total duration of 5,959 hours. The poor quality of supply and limited capacity for additional demand, limits further access expansion, thus inhibiting the GoKE's goal of achieving universal access by 2022.

24. **EEC has several network expansion projects in the pipeline identified in its 2017–2027 network expansion plan**. The proposed project draws from the expansion plan and will strengthen the electricity network in the Shiselweni region of Eswatini to improve the reliability of service and increase access to electricity for domestic and productive uses.

C. Relevance to Higher Level Objectives

25. **The Country Partnership Strategy (CPS) FY2015–2018 (report number 89210) recognized the country-specific constraints, as well as client demand for World Bank Group support in selected developmental areas, consistent with the World Bank Group strategic goals of reducing extreme poverty and promoting shared prosperity.** The CPS prioritized two program pillars: (a) *Promoting growth and job creation* to support the Government in creating an enabling environment for private sector investment and competitiveness, MSME

[12]Multiple Indicator Cluster Survey 2014 (Central Statistical Office, 2016)

growth, and job creation with an emphasis on agriculture and tourism; and (b) *Strengthening state capabilities* to design, implement, and monitor policies to reduce poverty and inequality. The project supports these pillars by providing reliable electricity supply to fuel the expected development outcomes. The proposed project is also acknowledged in the CPS Performance and Learning Review (PLR) falling under Pillar 1. The project supports improvements in the availability, quality, and reliability of electricity as a means of raising living standards for people in rural areas and small towns. This aligns with the World Bank Group twin goals of ending extreme poverty and boosting shared prosperity. Furthermore, the PLR states that the World Bank will support Government's objective of achieving universal access through an investment operation in FY 2019.

26. **In 2017, GoKE requested the cancellation of two lending operations programmed for the CPS period under the two pillars that had been prepared and approved by the World Bank's Board of Executive Directors.** The cancellation was due to a re-prioritization by the Government, that sought to focus the World Bank's support toward investments in public infrastructure. Hence GoKE requested that the loan proceeds that had been earmarked for the projects be channeled toward operations that would focus on priority rural infrastructure development. Specifically, GoKE requested for operations targeted at alleviating acute water shortages and overcoming energy supply gaps to improve living conditions and enhance employment and income generation activities.

27. **Improved availability and reliability of electricity supply will benefit schools, health centers and community centers leading to improved social welfare.** The project will reduce outages caused by run-down power infrastructure and inadequate network capacity in the project target area. This will improve the ability to deliver services provided by schools, health centers, and community centers and reduce their costs of operation through avoided backup generation.

II. PROJECT DESCRIPTION

A. Project Development Objective (PDO)

PDO Statement

28. To improve the reliability of electricity supply and increase access to electricity services in targeted areas of the Borrower.

PDO Level Indicators

29. The PDO level results indicators are:
    (a) Increased capacity to transfer power to targeted areas (Kilovolt-Ampere (KVA))
    (b) Number of annual power outages in the high voltage (HV)/medium voltage (MV) network at Hluthi and Nhlangano (Number)
    (c) Total duration of outages on HV/MV network at Hluthi and Nhlangano depots (Hours)
    (d) Increased number of households using electricity services in targeted areas (Percentage).

B. Project Components

30. The proposed project supports GoKE's goal of reaching universal access to electricity by 2022 and shall target the Shiselweni region of Eswatini.

Component 1: Reinforcement of the Transmission and Distribution Grid - Euro 27.7 million (US$31 million equivalent) of which IBRD Euro 25 million

31. This component comprises two sub-components with the objective of strengthening the transmission and distribution network in Shiselweni.

Subcomponent 1a: Reinforcement of the Southern Transmission Grid - Euro 24.1 million (US$27 million equivalent) of which IBRD Euro 22.3 million

32. Subcomponent 1a will finance the construction of 87 km of 132 kV transmission line from Nhlangano II to Lavumisa with two new 20 MVA 132/11 kV substations at Matsanjeni and Lavumisa, and expansion works at the existing 132/66/11k V Nhlangano II substation, and the 11k V Hluthi switching station that will be converted into a 20 MVA 132/11 kV substation. The network in the region is currently operated at 11 kV, which limits the ability to deliver power and the long lines result in low voltages that suppress the utilization of appliances. The low voltages, small conductor sizes, and loading on the lines result in high technical losses. This sub-component will help EEC improve its network to support growing demand in the region. It will cover the electrical, civil, and electromechanical work; switchgear; and protection and control equipment. Specific activities are as follows:

(a) Construction of Nhlangano II-Hluthi-Matsanjeni-Lavumisa 132 kV transmission line (≈87km) with associated communication, optical ground wire (OPGW), metering, and Supervisory Control and Data Acquisition SCADA capability;
(b) Construction of a 132 kV line bay and associated works at Nhlangano II substation;
(c) Expansion and conversion of Hluthi 11 kV switching station to a 20 MVA 132/11 kV substation; and
(d) Construction of 20 MVA 132/11 kV substations at Matsanjeni, Hluthi and Lavumisa.

33. The project was selected as the most viable option to address the network constraints based on the technical analysis and costing performed by EEC. The analysis provides a strong rationale for the project and detailed engineering studies will determine the final, design, line routing, and bill of quantities for procurement.

34. This sub-component will also finance the procurement of an Owner's Engineer who will support the Project Implementation Unit (PIU) with: (a) overall project management and supervision including procurement, design, contract management; and (b) supervision and monitoring of the implementation of the environmental and social instruments as needed. Under this subcomponent, a program of capacity-building activities will be designed and supported under the project to improve compliance with fiduciary, gender, monitoring and evaluation (M&E), and procurement requirements as well as implementation of environmental and social

standards under the project. The subcomponent will also support EEC in undertaking studies that will inform the necessary activities and investments in accordance with the electricity policy positions of the NEP 2018.

Subcomponent 1b: Distribution network reinforcement Euro - 3.6 million (US$4 million equivalent) of which IBRD Euro 2.7 million

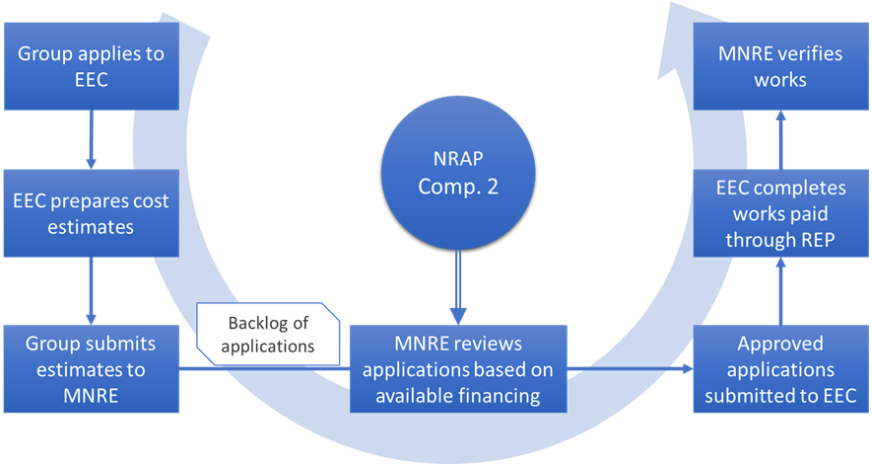
35. The objective of this subcomponent is to improve reliability of the distribution network in the Shiselweni region and align the distribution network with present and projected electricity demand. The subcomponent will finance various activities to link the new 132/11 kV substations to the distribution network, reinforce weak segments of the distribution network, and install control equipment in key segments of the network. Specific activities will include, among others: (a) construction of new feeders; (b) upgrade of distribution lines; (c) installation of remotely controlled protection equipment (auto-reclosers); and (d) installation of transformers.

36. A list of project activities has been identified by EEC and will be firmed up based on in-house detailed design work that shall be undertaken once the designs for Subcomponent 1a have been finalized.

Component 2: Electricity Access Expansion - Euro 10.7 million (US$12 million equivalent) of which IBRD Euro 8.9 million

37. Component 2 will support GoKE's program for rural electrification by financing an estimated 8,000 household connections through the REP. The component will be implemented by EEC's REU and shall target the Shiselweni region and will fund all costs up to the customer interface unit including the necessary MV and low voltage (11 kV and 0.4 kV) network, service drops, meters and circuit breakers for group schemes approved by MNRE. The REP supports group scheme applications[13] and available funding has been insufficient to keep pace with the number of applications for support being received. A backlog of applications awaiting to be financed has therefore built up at the MNRE. The project will fund group applications drawn from this backlog of applications from the Shiselweni region. The link between the project and the REP is shown in Figure 5.

Figure 5. Overview of the REP Process and Link to Component 2



[13] Typically comprising at least five households that submit a joint application for electricity connection.

38. For a standard electricity connection to be provided, customers will be responsible for and will be required to complete the household wiring, in accordance with EEC standards, and will have to pay the connection and administration fee which is currently SZL450 (US$30) before the connection is made. MNRE estimates that 15–20 percent of electricity service applicants are unable to afford the cost of household wiring, which is estimated to be a minimum of SZL1,500 (US$100). For these customers, EEC will offer the option, financed under the project, of providing a 'ready board' – an integrated consumer interface unit that includes metering and power outlets for a total rating of 20 A – which eliminates the need to complete household wiring.[14]

Component 3: Analytical Support and Capacity Building - Euro 1.8 million (US$2 million equivalent) of which IBRD Euro 1.8 million

39. This component will finance technical assistance to: (a) enhance electrification planning, implementation, monitoring, and verification capacity at the MNRE, considering the GoKE's stated goal of reaching universal access in the short term; and (b) support the implementation of the GoKE's policy positions as stated in NEP (2018) in general and specifically maximizing financing for development by enabling greater private sector participation in renewable energy generation and off-grid electrification. This component will also finance technical assistance to enhance the security of supply and support MNRE's capacity-building needs.

Component 4: Contingent Emergency Response Component (EUR 0 million: to be capitalized in the event of an emergency)

40. The objective of this component is to support GoKE's response in the event of an eligible emergency. This responds to a request by GoKE that the World Bank's portfolio enhances Eswatini's capability to respond to emergencies with major adverse economic and/or social impact. The component will be governed by paragraph 12 of the World Bank Policy on Investment Policy Financing (Rapid Response to Crises and Emergencies).

41. In the event of an eligible emergency being declared, GoKE may request the World Bank to re-allocate project funds to support the response effort. The component would be capitalized by drawing on uncommitted funds under Components 1 to 3. The component could also be utilized for processing additional financing should funding for this become available due to an eligible emergency.

C. Project Cost and Financing

42. The project will be financed through Investment Project Financing (IPF) over a period of five years. As shown in Table 2, the total project cost is expected to be EUR 40.2 million (US$45 million equivalent) comprising an IBRD loan of EUR 35.7 million (US$40 million equivalent) and a counterpart contribution of EUR 4.5 million (US$5 million equivalent). To aid implementation readiness, the project will allow retroactive financing for engineering studies and environmental and social standards activities. The retroactive financing shall be up to an amount not exceeding EUR 900,000 (US$1 million equivalent) under Category 1 of the disbursement procedures, and eligible payments may be made before the signing of the Loan Agreement and on or after April 15, 2019.

[14] The option to connect with a 'ready board' is available under the REP.

Table 2. Cost Estimates Per Component (in EUR)

	IBRD Loan (EUR million)	Borrower Contribution (EUR million)	Total (EUR million)
Component 1: Reinforcement of the Transmission and Distribution Grid	25.0	2.7	27.7
Component 2: Electricity Access Expansion	8.9	1.8	10.7
Component 3: Analytical Support and Capacity Building	1.8	0.0	1.8
Component 4: Contingent Emergency Response	0.0	0.0	0.0
Total	**35.7**	**4.5**	**40.2**

D. Project Beneficiaries

43. The project will improve reliability of electricity services and increase access to electricity in the Shiselweni region benefitting an estimated 8,000 households (approximately 30,000 people). Existing residential, commercial and industrial customers of EEC will also experience an improvement in the quality of service. The project will have multiple benefits in the targeted areas including the following:

a. Supporting rural electrification targets as included in NEP (2018) with the view of stimulating productive use of electricity and increased entrepreneurial activities.

b. Improving electricity supply quality and reliability through the introduction and construction of the proposed 132 kV overhead transmission line and associated 132/11 kV substations at strategic locations to improve the voltage profile of the electric distribution system in Shiselweni.

c. Reducing the overall technical system losses of the distribution system. The overall Eswatini electric grid system losses stand at 14.2 percent (comprising 11.3 percent technical losses and 2.9 percent commercial losses) of the national grid energy supply. A reduction in technical losses in the targeted areas is expected to be achieved after the implementation of the network reinforcement component of the project.

d. Ultimately, stimulating business and entrepreneurial activities owing to improved reliability and quality of supply. It is expected to lead to increased commercial, industrial, and residential electricity demand in the Shiselweni region and specifically around Matsanjeni and Lavumisa.

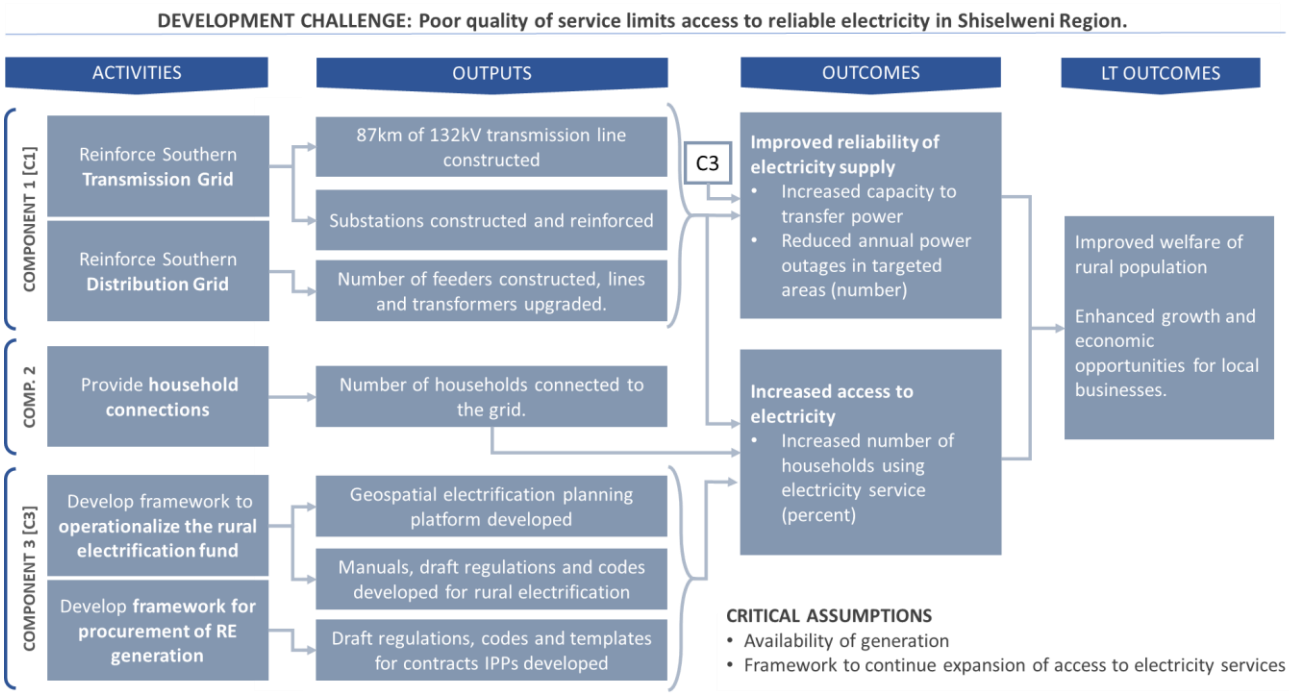
E. Results Chain

44. The current network in the Shiselweni region is near its capacity and this affects the ability to: (a) deliver reliable electricity services to existing consumers; and (b) expand access to unserved communities and businesses. The project activities are therefore designed to improve reliability of supply and increase the ability of the network to support additional demand. In the long term, the availability of reliable electricity in the region will support the enhancement of agricultural productivity, enhance economic opportunities including for local businesses, and improve the welfare of the largely rural population.

45. Full attainment of the project objectives hinges on the following critical assumptions:

- A sound framework to support the expansion of access to electricity services. This includes the GoKE's continued support to the REP, and an appropriate tariff structure and adequate tariff awards to ensure that EEC has adequate funds for the requisite operations and maintenance (O&M); and
- Availability of electricity supply. Electricity supply will need to keep pace with projected demand to avoid demand-supply deficits which will compromise service reliability

Figure 6: Project Results Chain



F. Rationale for World Bank Involvement and Role of Partners

46. The proposed project has been tested for the potential of private sector participation considering the World Bank Group's focus on for Maximizing Finance for Development (MFD). In general, electricity transmission infrastructure in Africa is viewed as exhibiting natural monopoly characteristics and for this reason tends to be financed by the public sector. For distribution networks, experience in Sub-Saharan Africa shows that private sector participation requires a conducive policy and a regulatory environment, which is yet to be established in Eswatini.

47. Adequate and reliable power will engender private sector entrepreneurial activities in sectors such as agriculture. Despite its high poverty level, the Shiselweni region has the highest share of households with agricultural land (81 percent), which indicates prospects for a vibrant agricultural economy[15]. Increased capacity and improved reliability of electricity supply will support agricultural activities and stimulate economic activity and could contribute to reducing poverty and boosting shared prosperity.

48. The project will also complement the activities of other partners in the sector. Under the Program Framework for Affordable Renewable Energy in Eswatini (PAREE)[16], the United Nations Development Programme is supporting the country's "shift to a low-emission and resilient development by accelerating the delivery of sustainable and affordable renewable energy." The PAREE objectives include: promoting off-grid solutions and formulating pro-poor investment for the decentralized development of renewable energy technologies; promoting and supporting investments in on-grid renewable energy; securing biomass power resources through increased sustainability, efficiency and productivity; and building institutional and personnel capacity for scaling up renewable energy in Eswatini.

G. Lessons Learned and Reflected in the Project Design

49. The project preparation considered World Bank's past operations addressing transmission and distribution systems and electricity access in Sub-Saharan Africa as well as engagements in the Middle East and Asia regions.

50. Key lessons learned and incorporated from these previous operations are listed as follows:

a) **Simple project design.** As the project is the World Bank's first energy sector engagement with Eswatini in a long period, the project scope has been kept simple, focusing on a limited set of interventions that align fully with existing policies and development plans. The project design does not propose any new institutional structures to achieve the objectives and aims to smoothen the implementation process by utilizing existing institutional and implementation architecture, which has proven to be effective. By doing so, the project aims to avoid introducing a new institutional framework that counterparts would take time to become familiar with and whose operationalization could negatively impact implementation progress

[15] Multiple Indicator Cluster Survey 2014 (Central Statistical Office, 2016)
[16] Previously referred to as the Program Framework for Affordable Renewable Energy in Swaziland (PARES)

b) **Allocation of tasks and responsibilities between implementing agencies.** Inadequate implementing agency capacity has been cited for poor performance in many energy sector operations in Sub-Saharan Africa. In particular, agencies that have good procurement and contracting capacity, along with a thorough technical/engineering understanding of the project tend to be better placed in achieving successful project implementation including schedule adherence. Furthermore, coordination deficiencies across agencies and/or the overloading of tasks on a single agency can lead to pronounced delays in delivering projects. To avoid these challenges, the project establishes a project steering committee (PSC) composed of the MNRE and EEC to ensure smooth implementation of joint or interrelated activities. EEC has strong technical capacity but is not familiar with the procurement regulations nor the environmental and social standards of the World Bank. The PIU of EEC will therefore be supported by an Owner's Engineer, who will provide project management and supervision in matters including procurement, contract management and compliance, monitoring and implementation of environmental and social instruments.

c) **Rural access expansions need to reflect the specific context.** Several access expansion projects in Sub-Saharan Africa and beyond highlight multiple issues around rural access. In particular, the high cost of connections has been cited as a barrier to reach poorer households and improve their quality of life while providing opportunities for livelihoods. While investments under the project are targeted at easing the backlog of connection applications, the technical assistance component will help the GoKE assess least cost options for reaching its goal of universal access by 2022. A suite of options will be considered including surveys and geospatial planning platforms to understand demand centers, usage patterns and the willingness-to-pay of rural consumers.

d) **Timely completion and monitoring of the technical assistance components.** Lessons learned from engagements with components focusing on creating a conducive regulatory environment for private sector participation in rural electrification highlight the depth of issues to be addressed to make sure the regulatory changes would be sustainable and receives commitment from clients. GoKE is committed to leverage private sector investments and to accelerate rural electrification. The project includes the necessary support toward implementation of the related analytical work and capacity development activities to help in monitoring implementation progress and ensuring timely delivery.

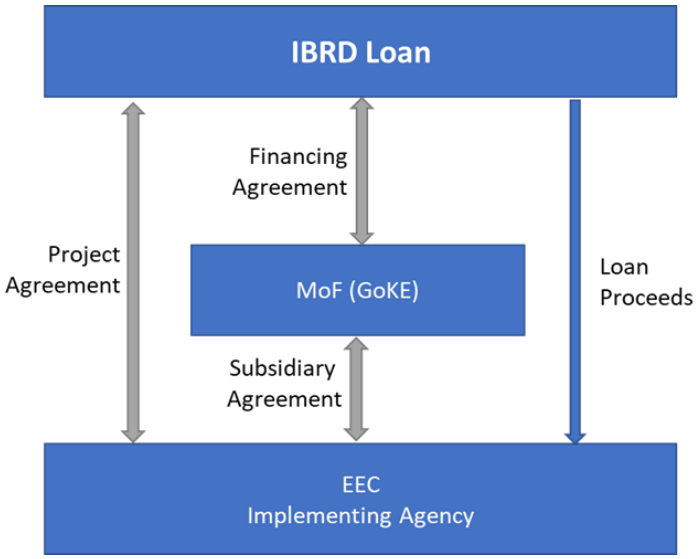
III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

51. The project will be implemented over a five-year period and will utilize existing government structures to meet the project's objectives. The IBRD loan will be to the Kingdom of Eswatini, through the Ministry of Finance (MoF), which will, through a subsidiary loan agreement, on-lend funds for Component 1 to EEC and on-grant funds for Components 2 and 3 to EEC. The on-granting arrangement follows the existing structure for GoKE's REP under which EEC does not bear the capital costs for rural electrification. Furthermore, since Component 3 will fund activities at the MNRE, the funds related to this shall also be on-granted to EEC.

52. As the Project Implementation Agency, EEC will manage the project on behalf of GoKE and, in this regard will be responsible for project fiduciary aspects. It will account for the deposits and withdrawals and will perform audits and provide financial reports in accordance with the World Bank policies and guidelines. EEC will monitor the utilization of the project resources by each beneficiary, including itself, and provide expenditure projections. It will be responsible for reporting in accordance with the project's Results Framework, providing regular implementation progress reports, as well as the Midterm Review Report and the Implementation Completion and Results Report. It will coordinate overall procurement under the project and will prepare and revise Procurement Plans as needed. Implementation of the activities under Components 2 and 3 will require coordination with the MNRE in accordance with the Project Implementation Manual (PIM). A Project Agreement between the EEC and the IBRD will capture these obligations and responsibilities. The implementation arrangements are shown in **Error! Reference source not found.**7.

Figure 7: Implementation Arrangements



53. For Component 2, Electricity Access Expansion, the project shall adopt the existing arrangements for the REP. Under the REP, the delineation of responsibilities towards attainment of GoKE's vision of universal access are

clearly defined amongst project funders, sponsors and implementing agencies. MNRE is the primary agency responsible for ensuring that the Government's rural electrification goals are met. MNRE, through its Department of Energy (DoE), works with three other government agencies in implementing the REP, namely the EEC, the Ministry of Tinkundla Administration and Development through the RDF and the Micro-projects coordination unit (MPCU) under the MEPD.

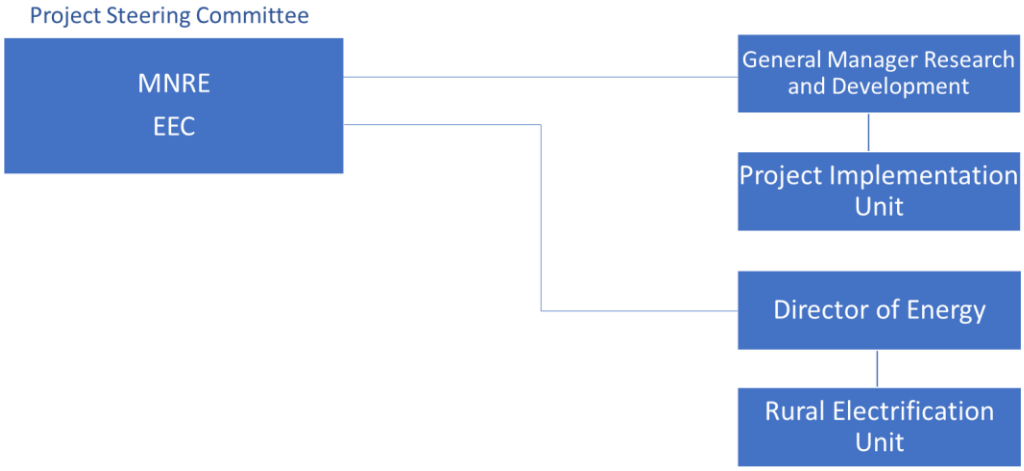
54. EEC implements GoKE's REP through its REU that coordinates the preparation of cost estimates for project sponsors to request funding from the REP, and, on approval of funds, ensures that requested works are tendered and completed. Details on the REP are shown in Annex 4.

55. Under the project, MNRE will be responsible for selecting the group schemes to be funded. This involves field visits to verify application data and assess the readiness of the scheme for support under the REP. Approved schemes will be submitted to EEC for construction and connection. The MNRE will also validate connections completed under the project through routine field visits and audits and report progress to the World Bank through the PIU.

56. Activities under Component 3 will also be closely coordinated between the PIU and MNRE that will develop the program of activities and applicable terms of reference and submit these to the PIU for the procurement of goods and services. MNRE will be responsible for the quality of the outputs under the Component.

57. A PSC will be established no later than one month after the effectiveness of the proposed project, comprising MNRE and EEC, that will ensure adequate coordination and provide overall policy guidance during project implementation.

Figure 8: Project Governance Structure



58. The PIU will be responsible for the preparation and physical implementation of the project. This unit will be under the oversight of the General Manager, Research and Development, comprising the following staff:

Project Manager; Procurement Officer; Transmission and Substations Engineer; Social Development Officer; and an Environmental Officer. EEC will allocate a specific staff member within the Finance Division, with responsibility for the project's financial management (FM) and reporting in close coordination with the Project Manager. The PIU will also work closely with MNRE in the implementation of Components 2 and 3 of the project.

B. Results Monitoring and Evaluation Arrangements

59. The PIU will be responsible for monitoring the project's implementation progress outlined in the Results Framework that defines specific outcomes and results. Progress reports will be prepared on a quarterly basis. M&E procedures in accordance with the Project Implementation Manual which will guide overall M&E activities. Activities to be monitored include the timely and efficient construction and commissioning of works under the project, quality control, processing of payments to contractors approved by the owner's engineer, the effective implementation of the Environmental and Social Management Plan (ESMP), - the Resettlement Action Plans (RAPs) of the project, and the successful completion of the capacity-building activities. The outputs of activities under Component 3 will also be collected and documented by the PIU, based on the list of output indicators specified in the project's Results Framework. In addition, the World Bank will carry out routine reviews of procurements financed by the project, undertake regular supervision missions, and review FM monitoring reports and quarterly implementation progress reports provided by EEC, among others. The implementation progress and results monitoring data collected by the PIU will inform the joint evaluation of project performance by GoKE, EEC, and the World Bank during regular supervision missions, at midterm, and at project closing.

C. Sustainability

60. While the project shall target the Shiselweni region of Eswatini, it shall be under-pinned and be integral to GoKE's REP through which significant progress in increasing access to electricity in Eswatini has been achieved. Through the project interventions, the institutional framework and implementation arrangements for the REP shall be strengthened by supporting capacity enhancements at the DoE at MNRE aimed at optimizing the selection of applications for inclusion under the REP and improving the M&E aspects of the program. For the Shiselweni region, the project will specifically address upstream bottlenecks by increasing transmission and distribution capacity which will enable scaled-up electrification in the region.

61. The project technical assistance component includes support to the MNRE for the development and operationalization of policies that shall enable greater private sector participation in renewable energy generation and the provision of access. This will include the adoption of off-grid technologies and delivery models that reflect the Eswatini context and is driven by the recognition that as the country approaches universal access the average grid connection cost shall rise significantly.

62. Increasing grid access to electricity is supported by the financial sustainability of the sector. The net profit margin of EEC has registered a strong upward trajectory from 6.2 percent in FY14 to 26.8 percent in FY18 with the operating margin and gross margin also depicting a similar trend. Historically, EEC has encountered short-term liquidity stress largely due to variations in weather patterns that affect generation output at the hydro facilities and reflect in the volume and cost of imports. With an FY18 debt/equity ratio of 13 percent the utility has sufficient

headroom to leverage additional debt financing for its capacity expansion program of which Component 1 of the project is an integral part.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

Technical Appraisal

63. . Engineering designs based on proven international standards (for example, IEC, IEEE, IS, BS, DIN17[)] with due consideration of the planning and operating criteria of EEC will detail the specifications for procurement, installation and commissioning of works under Components 1 and 2. The activities under Component 1 are part of EEC's network master plan while the activities under Component 2 are derived from the backlog of applications from GoKE's REP. Technical analysis conducted by EEC, including power flow analysis using the PowerFactory tool by DIgSILENT, shows that the proposed designs for Component 1 are technically feasible.

64. Recruitment, by EEC, of consultants to undertake the engineering studies, detailed designs, preparation of procurement documents, and the environmental and social impact assessment (ESIA) is underway. Subject to contracting, these activities are expected to be completed before December 2019.

Subcomponent 1a: Reinforcement of the Southern Transmission Grid

65. The current 11 kV overhead distribution line from Nhlangano to Lavumisa is the longest feeder at this voltage in the EEC network and serves the bulk of demand in the southern part of the country resulting in low voltages and supply disruptions. The proposed 132 kV transmission line from Nhlangano II to Lavumisa is part of the network masterplan for 2017-2027 developed by EEC. The completed line will increase capacity and reliability of electricity supply to rural communities of the Shiselweni region.

66. The technical design is not complex and will not be expected to lead to any significant upskilling of EEC personnel nor changes in EEC's operational procedures. EEC already operates 296km of 132kV lines and is familiar with the proposed technology. The technical analysis and costing carried out by EEC for the proposed project evaluated a do-nothing scenario as well as alternative voltage options and determined the proposed 132kV transmission to be the preferred option. The do-nothing scenario was rejected on the basis that if nothing is done, then the risk of supply interruptions due to voltage collapse was made worse. The 66kV option was also rejected due to voltage violations that the power flow analysis showed. Based on the study, EEC undertook a line route survey to establish a corridor for the transmission line. Cost estimates for the proposed line are based on quantities taken from the design and unit prices derived from the recently closed bids for the 132kV Stonehenge - Dwaleni II transmission line, financed separately from the project, and which covers a route with topography similar to the proposed transmission line.

[17] IEC - International Electrotechnical Commission; IEEE - Institute of Electrical and Electronics Engineers; IS - International Standards; BS - British Standards; DIN - Deutsches Institut für Normung eV (German Institute for Standardization; similar to US ANSI (American Nation Standards Institute); SANS - South African National Standard.

67. Procurement is in progress to complete engineering studies and designs for the transmission lines and substations with delivery of final procurement packages expected by November 2019. These studies will validate the assessment by EEC to ensure optimal network performance under current and future demand requirements in the region.

68. The consultant undertaking the engineering studies will also develop a plan for project packaging and sequencing for procurement and confirm the appropriate contract type for each package to reduce the risk of delays and prepare the necessary procurement documents. Measures to expedite implementation will include early procurement of long-lead items such as HV transformers.

69. The project will include a component dedicated to providing support for project and contract management through an Owner's Engineer to ensure adequate capacity is deployed for implementation, and to build the capacity of EEC for future similar assignments. Recruitment of the Owner's Engineer will be scheduled for completion in time for commencement of selection of contractors for the construction works. The Owner's Engineer will work closely with EEC to sequence construction events to minimize outages to consumers. Works at the Nhlangano II substation will have minimal impact on outages because the second supply point for imports at Edwaleni II can support the system load.

70. Based on the climate risk screening, the main climate-related risks are lightning during the summer and rainy season and inundation of substation equipment from heavy precipitation. The detailed design of substations will therefore consider these risks and incorporate adequate hardening measures.

Subcomponent 1b: Distribution Network Reinforcement

71. The sub-component will finance various activities to link the new 132 kV substations to the distribution network, reinforce weak segments of the distribution network, and install control equipment in key segments of the network. Specific activities will include, among others: (a) construction of new feeders; (b) upgrade of distribution lines; (c) installation of remotely controlled reclosers; and (d) installation of transformers.

72. The activities to be financed under this subcomponent will be based on the distribution network expansion plan included in the EEC Network Master Plan for the period 2017-2027 and the additional demand from the 8,000 connections expected under Component 2. An initial set of activities was identified and costed by the planning unit based on power flow analysis. When the final locations of the transmission substations are confirmed, further analysis will be conducted to verify the scope. Designs, specifications and preparation of procurement documents will be completed in-house by EEC.

73. The project's activities will largely be carried out on brownfield sites and work on greenfield sites will be limited to short spans. Thus, outages will be coordinated within the broader work program of EEC to minimize the impact to customers. EEC will use existing channels to adequately communicate outages to enable customers plan for inevitable outages.

74. To increase resilience of the network, underground cables will be considered for segments of the network prone to outages from lightening activity during the summer and rainy seasons. Underground cables are at least

four times more expensive to install and this could increase costs for the subcomponent by up to 30 percent.[18] The scope of the project will be adjusted accordingly to fit the budgeted funding.

Component 2: Access Expansion

75. The component will be implemented by EEC's REU focusing on the Shiselweni region and will help reduce the outstanding backlog of connection applications. This backlog comprises applications for which preliminary cost estimates have been completed by EEC.

76. Each group application is issued a unique ID. These ID numbers will be used to track the project's progress. The MNRE will verify data submitted with the application and will assess readiness of the scheme for connection as one of the criteria in reviewing applications. Readiness is assessed by the number of households that have completed internal wiring or have elected to have a 'ready-board' connected. Component 3 will help MNRE improve its M&E role in the REP and under the project.

77. To ease implementation coordination and streamline supervision and M&E, connection programs under the MPCU and the Rural Development Fund will be redirected to other regions. This will limit the number of contractors working on access expansion in the Shiselweni region. To ensure adequate awareness, the Stakeholder Engagement Plan (SEP) will be used to manage stakeholder expectations.

78. The backlog from MNRE has a wide range of costs per connection from the various group schemes ranging from US$207 to US$6,087 per connection assuming a 100 percent uptake rate[19]. A subset will be selected based on the cost per connection assuming an uptake rate of 60 percent. While connection costs have not been identified as a significant barrier to access, this is likely to emerge as an issue as the country moves closer to attaining universal access. MNRE therefore intends to undertake an assessment of willingness and ability to pay the connection fee of households that do not yet have access to electricity.

79. To increase resilience, aerial bundled conductors (ABCs) will be considered for use in areas exposed to high winds to reduce the risk of outages from debris and clashing conductors.

Economic and Financial Analysis

80. **Value added of the World Bank's Support.** The World Bank's value added comes from its extensive expertise and experience in electricity network strengthening and rural electrification projects globally. World Bank support will also improve inclusiveness under the Government's rural electrification and energy policies through strategic gender-focused programs which explores options to: (a) enhance the talent pool of women in technical and non-technical roles at MNRE and EEC; and (b) support a community engagement programs, that targets female headed households and group schemes.

81. **Economic analysis.** The analysis finds that the project is economically viable with an Economic Internal Rate of Return (EIRR) of 10.91 percent, and a net present value (NPV) of EUR 31.70 million (US$35.57 million) at a

[18] For example, "Underground vs. Overhead: Power Line Installation-Cost Comparison and Mitigation" https://www.elp.com/articles/powergrid_international/print/volume-18/issue-2/features/underground-vs-overhead-power-line-installation-cost-comparison-.html

[19] The share of households that connect to the grid under the project

6 percent discount rate. The sensitivity analysis indicates that these results remain sufficiently robust under significantly higher-cost and lower-benefit scenarios.

82. **Sensitivity analysis.** A switching value analysis was performed to test the robustness of the economic viability of the project to changes in the assumed values of key parameters. The results show that in the low case scenario under which the project analysis was conducted, the project remains viable until an increase in capital expenditure (CAPEX) by 82 percent. In relation to demand, power flow levels must be below 32 percent of projected levels for the project to become unviable. Under the low case scenario of power flows, the NPV of the project at 10 percent significance level is estimated at EUR 3.39 million (US$3.81 million). The results of this analysis, based on the lowest growth forecast, lowest willingness to pay (WTP) estimate, and lowest consumption assumptions are highly conservative, further enhancing the robustness of the estimates.

83. **Greenhouse Gas (GHG) Accounting:** The baseline for GHG accounting for Subcomponent 1a is based on a counterfactual from the scenarios in the pre-feasibility studies of EEC which considered a 66kV line versus a 132kV line. Emissions from loss reductions (or increases), land clearing, and circuit breakers are calculated for the project – 132 kV line and baseline – 66 kV line, and their difference indicates the level of net emissions from the project. The results are summarized in Table 3.

Table 3: Greenhouse gas accounting Summary

		Project	Baseline	Net
Subcomponent 1a				
Emissions from land clearing	[tCO2e]	42,055	30,840	11,215
Emissions from circuit breakers	[tCO2e]	14,760	7,380	7,380
Subcomponent 1a and 1b				
Emissions from losses	[tCO2e]	430,483	486,628	(56,145)
Component 2				
Emissions from access	[tCO2e]	79,669	150,588	(70,919)
Total emissions	***[tCO2e]***	***566,967***	***675,436***	***(108,469)***
Annual average emissions	***[tCO2e]***	***18,899***	***22,515***	***(3,616)***

84. The NPV of the project was calculated with low and high scenarios for the cost of carbon. In the low carbon cost scenario, the NPV of the project at a 6 percent discount rate after accounting for environmental benefits and costs is EUR 40.45 million (US$45.40 million). This increases to EUR 49.15 million (US$55.16 million) in the high case scenario. The EIRR increases to 12.33 percent in the baseline carbon cost scenario and 14.14 percent in the high case scenario. Table 4 presents the summary of the economic analysis.

Table 4. Summary of Economic Analysis

			With Project
1	Discount Rate	percent	6%
2	ERR excld externalities	percent	10.91%
3	ERR+ Local Externalities + GHG with World Bank guidelines	percent	12.33%
	Composition of NPV		
4	PV of CAPEX	EUR	-27,798,625.76
5	PV of O&M Costs	EUR	-4,164,371.71
6	PV of Cost of supplying new demand	EUR	-25,662,577.01
7	PV of additional power evacuated to households	EUR	10,900,296.94
8	PV of additional power evacuated to non-residential consumers	EUR	80,742,940.24
9	PV of Reduction in network losses due to project	EUR	-627,338.42
10	PV of benefits from new connections - Access Component	EUR	4,084,235.68
11	NPV (before environmental benefits)	EUR	31,696,908.41
12	Local and Global Environmental Benefits	EUR	8,760,016.72
13	NPV (including environmental benefits a base-case carbon price)	EUR	40,448,070.55

85. **Financial analysis.** The financial analysis confirms the viability of the project with a financial internal rate of Return (FIRR) of 32.1 percent and a financial net present value (FNPV) of EUR 16.29 million (US$18.31 million) at a financial discount rate of 1.5 percent. A sensitivity analysis on these results indicate that the project is vulnerable to increase in capital costs over 73 percent, demand growth below 40 percent and increase in O&M costs over 60 percent. Thus, the financial viability of the project remains sufficiently robust to significant cost overruns and has a good level of resilience under several sensitivity scenarios.

B. Fiduciary

(i) Financial Management

86. The FM system and arrangements at EEC are capable of producing periodic reports for monitoring the financial aspects of the project. EEC's FM system will be used for the implementation of the project, with the already laid-down oversight arrangements by MNRE and EEC's Board. This is based on EEC's acceptable FM system and capability of the system to produce reliable and regular unaudited interim financial reports (IFRs) and other financial reports.

87. The funds will be disbursed from the World Bank into an Euro denominated and segregated Designated Account opened by MoF at the Central Bank of Eswatini. Disbursements will be made based on a six months expenditure forecast. EEC will also maintain two local denominated Dedicated Project Accounts in a commercial bank for the implementation of the World Bank-financed components (Component 1 and for the on-granted Components 2 and 3) of the project. Disbursements by MoF into these accounts will be on a quarterly basis and based on the approved work plan. Other disbursement options such as advances, reimbursements, and special commitments will also be available if the need arises.

88. The auditing arrangements are also considered acceptable. EEC has received an unqualified audit opinion for the past three financial years (2017, 2016, and 2015). EEC's annual audit report and the auditors' management letter and management's response are to be submitted to the World Bank within six months of the end of each reporting period, that is, by September 30, each year. The FM arrangements meet the World Bank's minimum requirements under the Investment Project Financing Policy and Directive. See Annex 4 - Implementation Arrangements and Support Plan, for more details.

(ii) Procurement

89. All procurement to be financed under the project will be carried out in accordance with the World Bank Procurement Regulations for IPF Borrowers (dated July 2016), revised November 2017 and August 2018, the 'Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD and IDA and Grants', dated July 1, 2016 (the Anticorruption Guidelines) and the provisions stipulated in the Legal Agreement. Project procurement will be carried out by the Procurement Unit (PU) of EEC.

90. A procurement capacity and risk assessment has been carried out by the World Bank for EEC to review the organizational structure for implementing the project and the interaction between the project's staff responsible for procurement duties and management of the commission. The Procurement Risk Assessment and Management System has been finalized. An assessment of the current procurement unit under EEC identified the following key issues: (a) lack of procurement planning may lead to implementation delays; (b) non-monitoring of complaints may impede speedy resolution of the same; and (c) the current procurement unit staff have no experience with World Bank procurement procedures. Based on the assessment and taking note of the role and responsibility of EEC for procurement, the procurement risk rating is 'Substantial'. EEC will require strengthening of its procurement and contract management capacities. The PIU structure includes a position of Procurement Officer and the Owner's Engineer to be recruited will provide additional support to EEC for overall project management including contract management.

91. Risk mitigation measures based on the World Bank's assessment include: (a) hiring a procurement specialist with experience in infrastructure procurements; funded under the project, and putting in place a contract management plan for major contracts; and (b) training new and current staff on the World Bank Procurement Regulations and contract management.

92. A Project Procurement Strategy for Development (PPSD) has been developed to determine the approach to market, the selection methods, evaluation options, and sustainability considerations that may need to be included. The PPSD has considered this and other factors in determining the Procurement Plan, including the packaging of procurements. The market analysis revealed that there is adequate capacity, both in terms of numbers and capability, of local contractors for household connections and distribution works. The household connection packages are considered attractive because their values and complexity is within what has been executed before. However, for large works and engineering consultants there is limited capacity in the local market. The size and complexity of these packages are sufficient to attract participation from the international market as has been the case with previous similar projects implemented by EEC.

93. The implementing agency has prepared a Procurement Plan. The Plan will be uploaded into the World Bank's Systematic Tracking of Exchanges in Procurement (STEP) system, that will provide data on procurement

activities, establish benchmarks, monitor delays, and measure procurement performance. Procurement arrangements for the Contingency Emergency Response Component (CERC) will be described in the CERC Operational Manual.

94. **Contract management.** High-risk and high-value procurements have been identified for increased contract management support and indicated in the Procurement Plan. EEC will develop key performance indicators for the identified contracts and the key performance indicators will be monitored during the actual execution of contracts. The World Bank team will provide additional due diligence and independent review of the contract performance of such identified procurements. The fully staffed PIU will be responsible for overall project/contract management.

C. Legal Operational Policies

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

D. Environmental and Social

Environmental and Social Review Summary[20]

Social: The social risk associated with this project is assessed as moderate and is associated with construction labor management, resettlement, the context of prevalence of GBV incidents, and no prior experience of the Borrower and EEC with the Bank ESS. While the project does not anticipate the establishment of labor camps, the labor and community interface cannot be ruled out. Hence the risks are related to management of the labor and community interface in the mostly rural setting of the proposed construction activities. As per the GBV risk assessment tool of the Bank, the rating is moderate. Since the prevalence of GBV incidences is reported to be high in Eswatini, GoKE has initiated several proactive steps such the passing of the Sexual Offences and Domestic Violence Act (2018) and establishment of a tracking system for incidences. Several organizations are present in the country that are actively engaged on matters related to HIV, sexual and domestic violence. Furthermore, GoKE in 1987 established the Swaziland National Aids Programme (SNAP) that delivers its services through the thematic areas of HIV prevention, HIV care and treatment, research and cross-cutting interventions.

The proposed construction of the 87km 132 kV transmission line, three new 132/11kV 20MVA substations and related expansion works, and short lengths of the expected distribution line extensions, along with the low and dispersed population suggests a limited number of project-affected persons. However, the land ownership system is complex, and a substantial area is under the control of state and chiefs. It is anticipated that physical displacement shall be avoided to the extent possible, and that the associated impact including livelihood disturbance will be manageable.

A preliminary round of consultations at the 12 Royal Krall Level (chiefdoms) in the project area and at Mbabane (the capital city) level with various relevant organizations including those active in labor, GBV and HIV aspects and

[20] This is an extract from the appraisal stage ESRS which was disclosed on May 1, 2019.

Government Departments was carried out in March 2019. The objective of this consultation was to introduce the project concept and seek early feedback on potential concerns, risks and procedures the project must consider.

Management and mitigation in relation to labor influx and associated GBV and Sexual Exploitation and Abuse (SEA) risk is assessed further in the ESIA (ESS1), as part of the integrated approach in the Stakeholder Engagement Plan (SEP) and ongoing stakeholder engagement (ESS10), Community Health and Safety (ESS4) and Labor Management Procedures (ESS2).

The current country systems are not fully aligned with the ESF and so cannot be adopted for this project.

The social and environmental risks associated with the Project investments will be mitigated through the labor management Plan, Resettlement Policy Framework followed by sub component specific Resettlement Action Plan and Stakeholder Engagement Plan identified in the Environmental and Social Commitment Plan (ESCP). This builds upon the already existing and strong stakeholder engagement, labor management and HR systems of EEC.

Environment: The environmental risk for the project is moderate associated with the construction and operation of three sub-stations, rehabilitation and operation of one sub-station, installation and operation of approximately 87km 132kV transmission line and reinforcement of parts of the distribution network in the Shiselweni region to increase energy access to the communities living in the region. The anticipated environmental risks and impacts of the project are associated with the construction and operations of a typical transmission line and sub-station project which are site-specific, largely generated during the construction phase of the project, and can be mitigated with measures that are known and included in the Environmental and Social Management Plans (ESMPs) and associated plans (Health and Safety Management Plan, Traffic Management Plan and Waste Management Plan). These include (i) disturbances to the terrestrial flora from clearing vegetation and cutting of trees within the Right-of-Way of the transmission line and during site preparation at the sub-stations; (ii) disruption of the visual and aesthetic quality in the surrounding landscape from erection of 132kV towers; (iii) elevated dust concentrations and noise levels during site preparation and construction activities related to earthwork, cutting and filling operations or in material handling and storage areas; (iv) soil erosion and sedimentation of water bodies during the construction of the sub-stations if located within drainage channels; (v) occupational and community health and safety; (vi) traffic flow during construction; and (vii) waste generated from construction activities.

The Client is currently carrying out the Environmental and Social Impact Assessment to assess the magnitude of the impacts and recommend mitigation measures to reduce the risks and impacts based on a preliminary survey and early identification of risks and impacts carried out by the Client. Given that the nature, scope and location of activities under the distribution component will be determined during the implementation phase of the project, generic mitigation and monitoring measures are included in the ESMP. At the engineering study and detail design stage, the ESIA and the ESMP will be updated to include an alternative route analysis report and route alignment maps. A Construction ESMP will be prepared by the contractor before mobilizing resources on the project site. Given that majority of the anticipated environmental risks and impacts will occur during the construction phase, the contractor will be contractually bound to implement the ESMP consistent with (i) ESS1 through the Environmental and Social Impact Assessment (ESIA) and associated ESMP; (ii) ESS3 on Resource Efficiency and Pollution Prevention; and (iii) ESS4 on Community Health and Safety through the Health and Safety Plan and Traffic Management Plan.

The EEC PIU together with the contractor will be responsible for implementing the ESMPs. This will be undertaken by incorporating environmental management requirements into contract documents, and day-to-day monitoring of works

on-site during construction and implementation by EEC Safety, Health and Quality (SHEQ) staff.

Environmental and Social Instruments

95. The project has prepared, consulted upon, and disclosed all required instruments: Preliminary Environmental and Social Impact Assessment (ESIA), Resettlement Policy Framework (RPF), Stakeholder Engagement Plan (SEP), and Labor Management Procedures (LMP). The World Bank and the Borrower have jointly prepared an Environmental and Social Commitment Plan (ESCP) dated May 15, 2019, which includes measures for the preparation and implementation of the other environmental and social plans or instruments during project implementation. The instruments build upon the already existing and strong stakeholder engagement, labor management, occupational health and safety, and human resource (HR) systems of EEC.

96. The soft copies of the disclosed preliminary ESIA, RPF, SEP, LMP and ESCP are available on the EEC and World Bank websites. The hard copies of the same document are also being placed at key public buildings such as Regional administrator office, town council etc. The documents have been disclosed in English. However, the language used for community consultation is siSwati to ensure free flowing conversation and participation of stakeholders who cannot read and write. Although those that read the local language (siSwati) learn first to read in English and all newspapers in Eswatini are in English, the communication material used to reach out to affected communities will also be prepared in siSwati.

97. It is expected that the SEP and LMP will be updated and revised to reflect the evolving circumstances and context through the project life cycle. Further consultations on specific impacts and risks of all the project components shall be carried out as part of the ESIA and RAP during the engineering studies and design stages to inform and further update the draft documents.

The key Environmental and Social instruments as per applicable environmental and social standards in the project are listed below.

98. **ESIA and ESMP**: Measures to mitigate environmental and social risks and impacts aligned with ESS1 are included in the preliminary Environmental and Social Impact Assessment (ESIA) report and its associated Environmental and Social Management Plan (ESMP) prepared by EEC and disclosed on May 2nd, 2019. The preliminary ESIA/ESMP was prepared based on a preliminary survey carried out on a preferred Right-of-Way (RoW) and screening of environmental and social risks and impacts of an existing transmission line footprint. During implementation of the project, at the feasibility and detail design stages, the preliminary ESIA/ESMP will be updated to include an alternative route analysis report, route alignment maps and mitigation measures of site-specific environmental and social risks and impacts that will be determined through the feasibility studies to be prepared. Relevant management plans such as the Contractor's Environmental and Social Management Plan (CESMP), Occupational Health and Safety Plan (OHP), Traffic Management Plan (TMP) and Waste Management Plan (WMP), Labor Management Plan (LMP) will be subject to review and approval by the World Bank prior to the start of any construction works. Given that the majority of the anticipated environmental risks and impacts will occur during the construction phase, the contractor will be contractually bound to prepare and implement the CESMP, OHP, TMP, LMP and WMP consistent with (i) ESS1 on Environmental and Social Impact Assessment (ESIA); (ii) ESS2 on Labor and Working Conditions; (iii) ESS3 on Resource Efficiency and Pollution Prevention; and (iv) ESS4 on Community Health and Safety.

99. **Stakeholder Engagement Plan.** The SEP aligned with ESS 10 and disclosed on April 23,2019 by EEC includes the main stakeholders at various stages of the project cycle, roll out, staffing, and budget arrangements. The project shall engage community liaison officers at the local community level. These officers will serve as an entry point for community engagement and grievance redress. The SEP will ensure that any impacted community and beneficiaries are consulted on technical solutions and participate throughout the project cycle. The SEP details the project-specific GRM and incorporates this with the existing EEC procedures (which include a toll-free customer telephone line and whistle blower protection). The GRM is designed to address concerns and complaints promptly and transparently with no adverse impacts (for example, cost and discrimination) to project-affected persons for any reports that they provide. The GRM will work within the existing legal and cultural frameworks, providing an additional opportunity to resolve grievances at the local and project level. The Project Contact Person within the PIU at EEC will be responsible for receiving, reviewing, recording and addressing project-related complaints. As part of the environmental and social assessment, the Borrower will maintain, and disclose, a documented record of stakeholder engagement and GRM.

100. **Labor Management Procedures.** Labor Management Procedures aligned with ESS2 and ESS4 and disclosed on April 23, 2019 by EEC are applicable to all project staff (permanent and temporary), contractors' staff and primary suppliers to the project. The findings of the preliminary ESIA and the World Bank's GBV Risk Assessment Tool guide the identification of SEA and GBV risks and preventive actions. The LMP prepared by EEC outlines specific measures that EEC and its contractors under this project should put in place to mitigate project related GBV risks such as: (a) specialized agencies will be engaged to roll out a sensitization and training program for project workers and community on GBV and HIV and other health risks; (b) the ESIA/ESMP will fully describe the GBV risks and mitigation measures at the design stage; (c) a labor management plan as part of the ESMP including a code of conduct (embedding GBV requirements) will form part of the procurement documentation for the contractors and the Owner's Engineer; and (d) EEC, the Owner's Engineer and contractors will be required to record, report and act on such incidences, if any, as part of the incident reporting system.

101. **Resettlement Policy Framework (RPF) and Resettlement Action Plan (RAP)**. An RPF aligned with ESS5 and disclosed by EEC on May 02, 2019 shall guide the preparation of RAP/s under the project. The RPF details principles and procedures for managing the acquisition of land, restriction of land use and involuntary resettlement. Efforts are being made to avoid and minimize resettlement impact as part of preliminary surveying of possible transmission routes. The preliminary survey suggests that the existing servitude can be followed for more than 50 percent of the length of the transmission line and largely traverse through communal land and smallholder farms used for grazing and subsistence farming under traditional governance. Proposed construction activities including sub stations, transmission line, distribution lines etc. may lead to loss of land, assets and restriction to productive use of land. The anticipated impact is primarily related to the transmission line. The footprint required for distribution and household connections is minor and will be further assessed once designs become available. EEC has agreed to prepare RAP/s once the specific impact location(s) of Component 1 and 2 activities are known and more information is made available during design stage. EEC has agreed to ensure that all compensation and resettlement assistance payments are fully completed prior to handing over of sites to contractors and commencement of civil works. Upon completion of compensation and resettlement assistance payments, the PIU shall submit to the World Bank a completion report and shall secure World Bank's clearance before initiating civil works. Part of the proceeds of the Borrower's counterpart contribution of US$5 million will be to finance resettlement impacts associated with Component 1 and 2 activities.

Gender

102. The GoKE has promulgated and amended a number of important policies, statutes and strategies to protect and promote the rights of women. The Bill of Rights in the Constitution provides for equality before the law and equal opportunities for women and men in political, economic and social spheres. In 2004, the Government ratified the UN Convention on the Elimination of All forms of Discrimination Against Women and it passed the National Gender Policy and Action Plan in 2010. However, the progress of implementation remains slow. Gender inequality in Eswatini is exacerbated by strong patriarchal traditions, values, and norms. Other factors contributing to gender inequality include weak legislation and poor access to means of production, education and health. Evidence shows that a number of socio-cultural and economic factors contributing to increased women and girl's vulnerability include, for example, gender-based violence (GBV), polygamy and limited employment and economic opportunities.

103. Energy infrastructure development are critical for achieving the development objectives of countries, however, women's opportunities to contribute to the energy sector are limited, with a visible lack of gender diversity in technical and senior management positions globally. Systemic barriers to women's participation in education and employment in technical fields occur at different stages and at multiple levels of a woman's life: within households, in the community, across institutions, and in the broader society. In Eswatini, women's labor market outcomes are less favorable than those of men in terms of both employment and unemployment rates as well as labor force participation. In contrast, both employment and unemployment gender gaps narrowed for tertiary education, pointing to its possible equalizing role.

104. In addition, women bear the brunt of insufficient energy access from a time burden, drudgery and health perspective given their underrecognized roles as providing cooking fuels wood and labor for non-mechanized tasks. Ensuring women are informed of their consumer rights and opportunities at a national level when it comes to access can mean more connections and usage. Focusing on women as a specific and distinct target group for energy services offers a way to expand the customer base and ensure households are informed of their consumer rights, basics around safety and maintenance and billing issues.

105. In the NEP (2018) Implementation Strategy, commitments are outlined for establishing targets for gender balance in the energy sector and yearly reporting on progress made and enhanced focus on empowering marginalized groups in the energy sector. In addition, MNRE has ambitions to provide input on energy issues in school curricula together with the Ministry of Education, which provides an entry point to stimulate girls' interest in the energy sector. EEC is already reporting on sex-disaggregated employment data which shows that 25 percent of full-time employees are female. The target of 27 percent full-time employees has been selected based on consultation in-country. EEC does not expect to expand much in the next few years and the focus will be on filling new positions with possible female talent through the interventions outlined below on recruitment and retention and promotion.

106. Given the gender gaps highlighted, options will be explored to enhance: (a) the talent pool of women in technical roles and non-technical roles at the MNRE and EEC; and (b) community engagement program, targeting female heads of household and group schemes.

107. **Women's employment.** Entry points to be explored will include developing a technical assistance program to help the MNRE and EEC enhance its pipeline and current talent pool of women, for example, through approaches across recruitment and retention and promotion.

Recruitment

- Promoting women's participation through job advertisements that include inclusive languages
- Increasing girls' and young women's exposure to employment in the sector and to opportunities, for example, bring a girl child to work day and field visits
- Mentoring (education and pre-workforce)
- Engaging young women in school-to-work transition career choice
- Providing unconscious gender-bias training for recruitment

Retention and Promotion

- Hosting a series of learning event's related to women's employment
- Identifying and showcasing role models in-country or region who are working in this sector
- Engaging trade unions for gender equality
- Engaging external women's professional networks and current talent pool through targeted exchanges in the region, for example, Women in Engineering (WomEng) Eswatini and ESKOM[21] mentoring programs for the female workforce

108. Women are underrepresented in the local group scheme bodies, which interface with EEC on issues related to connections, bill payment, and maintenance. This means that women are on unequal footing with their male partners, male heads of households, and community leaders when it comes to accessing information regarding subsidies, application procedures, bills, safety aspects, and so on. An assessment will be conducted to assess the current inequalities that may exist in project community sights to inform the interventions that need to be designed to ensure women play a more prominent role in the equitable delivery of energy services.

V. GRIEVANCE REDRESS SERVICES

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

[21] Eskom is the state-owned South African electricity public utility, established in 1923 as the Electricity Supply Commission and also known by its Afrikaans name Elektrisiteitsvoorsieningskommissie from which the acronym ESKOM is derived

and-services/grievance-redress-service. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

VI. KEY RISKS

109. The overall risk of the project is **Moderate**. This is primarily due to the relatively good operational and financial health of project implementing agency EEC that has experience in implementing capital expansion projects. It is however expected that it will take some time for the utility and relevant GoKE counterparts to become fully acquainted with World Bank policies, guidelines and processes. It is also noted that the project has been prepared following the GoKE's cancellation of two investment operations that had been approved by the World Bank Board of Executive Directors due to a shift in Government priorities. In addition, all loans require Parliamentary approval before they can be contracted and there is no assurance that this will be obtained for this project. ***Mitigation:*** The project will draw on lessons from the PLR to include a blend of technical assistance and infrastructure support, extensive engagement with political principals, and collaboration with development partners. For example, two local government and health projects, which were successfully implemented under the current CPS, incorporated both technical and infrastructure investments that met needs for capacity strengthening while equally contributing to 'tangible' service delivery. To the extent possible, the project will also seek complementary non-lending financing to support some of the activities under Component 3. Regarding the risk of cancellation, the GoKE has prioritized the implementation of infrastructure development projects including the proposed project. In addition, the project has been approved for implementation by the Board of EEC. The project team will also continue to deepen the sector dialogue with the GoKE and EEC counterparts during preparation to ensure buy-in across the relevant stakeholders. The World Bank Group is already engaged extensively with key stakeholders and paid a courtesy visit to the King, which provided the much-needed clarity on program decisions and collaboration going forward. To support implementation, a dedicated PIU will be established at EEC comprising experienced staff with relevant qualifications, and the project will finance the services of an experienced Owner's Engineer (Project Supervision Consultant). In the meantime, the World Bank has already provided training on the Environmental and Social Framework (ESF) to EEC counterparts expected to be assigned to the project with additional trainings/workshops on the World Bank project cycle planned during preparation.

110. Other key risks that might affect the success of the operation are listed in Systematic Operations Risk-rating Tool (SORT) presented in the datasheet of this document.

111. **Political and Governance - Substantial.** Though Eswatini has enjoyed a stable political environment and continuity in Government, the implementation of government initiatives depends on high-level political commitment. However, weak governance structures can undermine accountability, transparency and mechanisms for setting national priorities. The equal importance of both the traditional and modern system of government complicates clear decision making and might lead to policy reversal or even project reversal as previously experienced. ***Mitigation:*** A deepened sector dialogue will enable more frequent engagement with GoKE and other stakeholders to keep them updated on project progress and the expected benefits.

112. **Macroeconomic - High**. Both the macroeconomic current and outlook conditions are fragile, as the Government fails to implement clear policies that can reverse the fiscal challenges. While the Government has

repeatedly emphasized its commitment for fiscal consolidation the reforms necessary have not been fully implemented and the continued failure to do so may lead to increased domestic arrears and debt levels, threatening macroeconomic stability. The government's difficulties in paying its suppliers thus accumulating arrears which in turn negatively affected business activity and expansion has also heightened financial sector vulnerabilities. This is compounded by the persistent decline in SACU revenues in 2018. The exchange rate and balance of payment pressures emanating from low growth prospects of the South African economy might contribute to higher inflation that may make key project inputs more expensive. ***Mitigation:*** The World Bank continues to maintain a dialogue on the macroeconomic situation that includes policy discussions and advice aimed at improving the overall economic outlook.

113. **Institutional capacity for implementation and sustainability - Substantial.** Amongst its regional peers, EEC compares favorably, particularly with respect to its financial performance. EEC has a functional planning and project management department and maintenance departments in its structure. However, the utility company has not implemented a World Bank-financed project for at least the past 20 years and hence the staff are not familiar with World Bank procedures for project preparation and implementation, including procurement and social and environmental standards. This could impact preparation, implementation and operation of the project. ***Mitigation:*** The project will include the needed training in project planning, design, and implementation. The risk of project delays will be mitigated through a project supervision consultant who shall be recruited to support the PIU to assist with contract management and construction supervision throughout the implementation period as well as by application of the World Bank's Procurement Regulations and environmental and social standards.

114. **Fiduciary – Substantial.** The project's fiduciary rating is assessed as Substantial given that the Country is undergoing critical public financial management reforms and the proposed implementing agency EEC, has no experience with World Bank Procurement Regulations for IPF Borrowers and Financial Management and Disbursement Guidelines. ***Mitigation:*** During preparation and implementation, the World Bank will support EEC and the GoKE on capacity building in fiduciary management. The dedicated PIU for the project will include suitably qualified and experienced procurement and FM specialists that shall be trained as necessary on the World Bank's fiduciary requirements.

115. The **Environmental and Social risk classification** of the project is **Moderate**. The project will generate positive environmental impacts from reduced use of biomass for fuel, including positive socio-economic benefits to the communities and other entities that will have access to electricity because of the connections provided by the project. Anticipated environmental risks and impacts of the project are associated with the siting, construction and operations of a typical project that entails erection of transmission lines and construction of sub-stations which are site-specific, largely generated during the construction phase of the project, and can be mitigated with known measures. Based on the preliminary Environmental and Social Assessment carried out by EEC, environmental risks and impacts are related to: (i) the aesthetic and visual quality of the surrounding landscape of the project area from the erection transmission towers; (ii) erosion and sedimentation of rivers (mainly ephemeral streams) from earth works and run-off during the construction phase; (iii) disruption of traffic flow and increased traffic safety risks during the construction phase; (iv) disposal and management of large amounts of excavated material generated from construction activities during the construction phase; (v) occupational health and safety of workers both during the construction and operational phases; (vi) increased level of dust, noise and vibration from moving of construction vehicles and machinery; and (vii) community health and safety risk. Both,

the visual survey carried out by EEC and the task team and the preliminary environmental assessment carried out by EEC, confirm that there are no sensitive ecological sites within the project area that would likely be impacted by project activities.

116. The social risk associated with this project is: (a)managing the labor community interface given the context of prevalence of GBV incidents and HIV; (b) construction of power transmission lines, towers, substations; and distribution lines leading to land appropriation and restriction of land use both permanent and temporary; and (c) no prior experience of the Borrower and EEC with the World Bank ESS. It is anticipated that physical displacement shall be avoided to the extent possible, and that the associated impact including livelihood disturbance will be manageable. The project will largely depend on local labor and have several prevention programs in place. As per the current assessment with the help of World Bank GBV risk assessment tool the project is rated as moderate.

117. **Climate and disaster risks**. The key risks due to climate change impacts are inundation and droughts. The climate change risks in Eswatini were assessed through the World Bank's Climate and Disaster Risk Screening Tool, and the three main risks identified were inundation due to extreme precipitation and flooding, extreme temperature, and drought. Between 2020 and 2039, monthly mean temperatures will increase by up to 1.23 ^{o}C in the hottest months, that is, January to March, and between 2040 and 2059 it is expected that temperatures shall rise by up to 2.2^{o}C during the same months. The number of extremely hot days (>40^{o}C) in a year is projected to increase by 2.4 days over the 2020-2039 horizon and rising to 4 days over 2040-2059. Precipitation could increase or decrease by 32.8mm and 34.5mm over 2020 - 2019. Change in annual rainfall for very wet days is also projected to increase by 159 percent or fall by 117 percent while the projected change in annual severe drought likelihood for 2020 - 2039 could increase by as much as 29 percent. The design of lines and substation will consider the risks of flooding in the design specifications under each component. Changes in heat will increase cooling demand in the region and increase loading on the line. The transmission line will have adequate capacity to support the additional demand. Droughts would affect generation capacity at the hydro power stations and in the absence of sufficient alternative energy sources lead to load shedding in the project area and in the entire country. A CERC is included under the project which could be triggered to minimize the impacts of such extreme events.

118. **Climate co-benefits**. The project will provide adaptation and mitigation co-benefits by considering resilience measures in designing the distribution network upgrades and through a reduction in technical losses. Under Subcomponent 1b, underground cables will be used for segments of the network prone to outages from strong winds during the summer and rainy seasons. Underground cables are at least four times more expensive to install and this would increase costs for the component by up to 30 percent. The scope of the project will be adjusted accordingly to fit the budgeted funding. Under Component 2, the project will use ABCs in areas exposed to strong winds. ABCs offer better resistance to winds and flying debris compared with exposed conductors. Activities under Subcomponents 1a and 1b are expected to reduce technical losses by 3 percent from project close, thus providing mitigation co-benefits.

VII. RESULTS FRAMEWORK AND MONITORING

Results Framework
COUNTRY: Eswatini
Network Reinforcement and Access Project

Project Development Objectives(s)

To improve the reliability of electricity supply and increase access to electricity services in targeted areas of the Borrower.

Project Development Objective Indicators

Indicator Name	DLI	Baseline	Intermediate Targets	End Target
			1	
Improve the reliability of electricity supply in targeted areas of Eswatini				
Increased capacity to transfer power to targeted areas (Kilovolt-Amphere(KVA))		11,400.00	11,400.00	116,000.00
Number of annual power outages in HV/MV network at Hluthi and Nhlangano (Number)		923.00	875.00	738.00
Total duration of outages on HV/MV network at Hluthi and Nhlangano depots (Hours)		5,957.00	5,660.00	4,766.00
Increase access to electricity services in targeted areas of Eswatini				
Increased number of households using electricity services in targeted areas (Percentage)		0.00	10.00	25.00

Intermediate Results Indicators by Components

Indicator Name	DLI	Baseline	Intermediate Targets	End Target
			1	
Reinforcement of the Transmission and Distribution Grid				
Length of transmission line constructed (Kilometers)		0.00	40.00	87.00
Number of transmission substations constructed or expanded (Number)		0.00	2.00	4.00
Number of distribution feeders or lines constructed or rehabilitated (Number)		0.00	8.00	20.00
Technical loss reduction in targeted areas (Percentage)		0.00	1.00	3.00
Grievances registered related to delivery of project benefits that are actually addressed (Percentage)		0.00	100.00	100.00
Percentage full-time female employees EEC (Percentage)		25.00	25.00	27.00
Increase in electricity sales (Percentage)		0.00	1.50	5.00
Electricity access expansion				
People provided with new or improved electricity service (CRI, Number)		127,892.00	128,892.00	159,892.00
People provided with new or improved electricity service - Female (CRI, Number)		65,224.00	69,000.00	81,544.00
People provided with access to electricity under the project by household connections (grid or off-grid). (CRI, Number)		0.00	8,000.00	32,000.00
People provided with access to electricity through Community electricity connections under the project. (CRI, Number)		0.00		0.00

Indicator Name	DLI	Baseline	Intermediate Targets	End Target
			1	
People provided with inferred access to electricity through Additional generation capacity under the project. (CRI, Number)		0.00		0.00
Analytical support and capacity building				
Number of studies completed (Number)		0.00	2.00	2.00
Number of EEC and MNRE staff trained (Number)		0.00	10.00	20.00

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Increased capacity to transfer power to targeted areas	Transmission capacity from Nhlangano II towards Lavumisa. Baseline is 4x2.8MVA feeders. Target of 0MVA is based on the thermal rating of the new line.	Annual	Technical specification of procured conductors.	Manufacturer's product data sheet	PIU
Number of annual power outages in HV/MV network at Hluthi and Nhlangano	Total number of supply outages in HV/MV network in Hluthi and Nhlangano depots that last 3 minutes or longer. Target is a 20% reduction in outages. 3 minutes is based on EEC	Twice a year	SCADA system	Report from SCADA system at National Control Center	PIU

	standard in calculating SAIFI.				
Total duration of outages on HV/MV network at Hluthi and Nhlangano depots	Total duration of supply outages in HV/MV network in Hluthi and Nhlangano depots that last 3 minutes or longer. A 20% reduction is expected.	Twice a year	SCADA	SCADA reports from National Control Center	PIU
Increased number of households using electricity services in targeted areas	Percentage change in the number of domestic customers (Tariff category S1 and S10) of EEC funded by the project. The baseline is 31,973 households (127,892 persons assuming 4 persons per household).	Twice a year	EEC customer management system	EEC customer service will report connections based on ID's submitted with applications	PIU

Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Length of transmission line constructed	Transmission line length	Twice a year	Contractor progress report	Contractor reports verified by EEC	PIU
Number of transmission substations constructed or expanded	Number of transmission substations constructed or expanded	Two times a year	Contractor progress reports	Contractor progress report verified by EEC	PIU
Number of distribution feeders or lines constructed or rehabilitated	Number of feeders or lines constructed or rehabilitated	Two times a year	Contractor progress	Contractor progress report verified by EEC	PIU

			report		
Technical loss reduction in targeted areas	Reduction in system technical losses in Nhlangano and Hluthi depots. (Baseline losses in percent minus losses in percent)	Twice a year	EEC metering unit or Results of power flow simulations.	Metering records from EEC. Currently, metered data includes commercial losses. The possibility of installing measuring equipment that better estimate technical losses will be evaluated. As an alternative, power flow simulations will be used to estimate technical losses. Simulations of the current system show technical losses of approximately 23%.	PIU
Grievances registered related to delivery of project benefits that are actually addressed	Effectiveness of GRM (Mechanisms: Hotlines, complaint boxes etc.)	Twice a year	Records filed through the project's GRM	Grievances addressed/total grievances	PIU
Percentage full-time female employees EEC	Share of full-time female employees to total number of employees	Once a year	EEC HR records	EEC HR records	PIU
Increase in electricity sales	Change in electricity consumption to customers in Nhlangano and Hluthi depots as a share of consumption in 2018	Once a year	EEC commercial department.	Billing data	PIU

	(calendar year).				
People provided with new or improved electricity service		Twice a year	EEC customer management system	EEC customer service will report connections based on ID's submitted with applications.	PIU
People provided with new or improved electricity service - Female		Twice a year	Estimated from national surveys	Based on national average household size of 4 and share of females of 52% of population.	PIU
People provided with access to electricity under the project by household connections (grid or off-grid).		Twice a year	EEC customer management system and a national average household size of 4	EEC customer service will report connections based on ID's submitted with applications.	PIU
People provided with access to electricity through Community electricity connections under the project.					
People provided with inferred access to electricity through Additional generation capacity under the project.					

Number of studies completed	Number of studies funded by the study	Once a year	MNRE	MNRE	PIU
Number of EEC and MNRE staff trained		Once a year			

ANNEX 1: Detailed Project Description

Subcomponent 1a

1. A vast portion of demand in the Shiselweni region is supplied through a 90 km 11kV overhead distribution line from Nhlangano. This is the longest feeder in Eswatini resulting in low voltages and supply disruptions. EEC therefore intends to strengthen the network in the region by introducing a HV overhead transmission line to provide the needed capacity for bulk transfer of power.

2. The 132 kV transmission line from Nhlangano II to Lavumisa is part of the network masterplan for 2017 - 2027 developed by EEC and approved by the GoKE. The completed line will increase capacity and reliability of the electricity supply to rural communities of the Shiselweni region.

3. It forms part of the vision to construct a 132kV transmission backbone across Eswatini. The master plan is based on modest demand growth projections of 2.4 percent, 2.6 percent and 2.8 percent for the low, medium and high growth scenarios, respectively. Under these scenarios, the system peak load for the country is expected to grow from 231 MW to 288 MW, 291 MW and 295 MW for the low, medium and high scenarios by 2027, respectively.

4. Procurement is in progress to complete detailed engineering studies and designs for the transmission lines and substations. The final design package will include a Bill of Quantities PLS CADD line profiles and technical specifications for the conductor, insulators, hardware, towers, foundation and earthing requirements. The scope includes among others, the following activities:

i. Confirmation of the location of substations and fixing the route alignment for the transmission line through a detailed survey including plan and profiling, tower schedule, tower spotting and optimization of tower locations using appropriate tools.

ii. Coordination of route selection work with the consultant for the ESIA that will progress in parallel to align environmental, social and technical priorities.

iii. Performance of geotechnical investigations including electrical resistivity test at tower locations and substations.

iv. Specification of details for the transmission line including tower structures, classifications, and foundations according to site and weather conditions, as well as the selection of conductors, shield wires, OPGW, insulators and all other line accessories.

v. Preparation of substation designs including the sizing and rating of transformers and reactive power compensation devices; single line diagrams; layout and sectional drawings; equipment specifications; insulation coordination studies; protection, SCADA, and communication design; equipment foundation designs and drawings; and other necessary civil and structural designs.

vi. Preparation of Bills of Quantities and tender documents based on the various items of work to be executed in accordance with the drawings and the technical specifications;

5. EEC has prepared a technical assessment based on power flow analysis and determined a preliminary corridor for the transmission line and substations. The length of the transmission line is approximately 87km and will start from the existing Nhlangano II substation and loop in and out at Hluthi and Matsanjeni and terminate at Lavumisa. The servitude for the line is 30m and will utilize an existing servitude for 11 kV (originally intended for a 33kV line) and 66kV lines for approximately 50 percent of the route. It is envisaged that on a 3km stretch in the town of Nhlangano, double circuit structures will be used to accommodate the existing line and the new 132 kV line. The line will be equipped with OPGW for communication and control. The final tower designs will be determined by the engineering study and designs. A map outlining the route of the proposed transmission line location of the substations is shown in Annex 5.

6. **Nhlangano II**. The existing 132 kV substation at Nhlangano II substation is one of two substations that receives bulk supply from Eskom, South Africa and is currently equipped with two 20 MVA 132/66 kV transformers and one 10 MVA 66/11 kV transformer that supplies the load in the south of Shiselweni. This substation will be extended by approximately 20m (a total area of 1,260m^2) to accommodate a new bay for the 132kV transmission line under the project and the protection and control system will be upgraded to replace obsolete equipment.

7. **Hluthi**: There is an existing 11 kV switching station at Hluthi. A 132/11 kV station will be constructed close to the existing station to tie in with the 11 kV network. The station will be equipped with two 10 MVA 132/11 kV transformers to supply new and existing feeders that will be installed under Subcomponent 1b.

8. **Matsanjeni and Lavumisa**: Two new substation are proposed at Matsanjeni and Lavumisa. Each station will be equipped with two 10MVA 132/11kV transformers to supply new and existing feeders that will be installed under Component 1b.

9. Reactive power compensation will be provided to support system voltages the sizing and location of which will be determined by the feasibility study. Substation configurations vary at different locations and the feasibility study will propose designs that balance reliability with the projected demand growth for the region.

10. The feasibility study will propose implementation arrangements for works on brownfield sites to minimize outages to consumers. Works at the Nhlangano II substation will have minimal impact on outages because the second supply point for imports is at 400 kV and can support the entire system load. Arrangements to replace the existing 66kV line may include the use of temporary towers as is currently proposed under another transmission line project by EEC.

Subcomponent 1b

11. The objective of this subcomponent is to improve reliability of the distribution network in the Shiselweni region and align the distribution network with present and projected electricity demand. The subcomponent will finance various activities to link the new 132 kV substations to the distribution network, reinforce weak segments of the distribution network and install control equipment in key segments of the network. Specific activities will include, among others: (a) construction of new feeders; (b) upgrade of distribution lines; (c) installation of remotely controlled reclosers; and (d) installation of transformers.

12. A preliminary list of project activities has been identified by EEC and will be finalized when the locations of the transmission substations are confirmed. Works will be based on detailed design to be completed by the project section in Table 1.1. EEC will procure materials and labor for implementation of the works.

Table 1.1: Potential Project Activities Under Subcomponent 1b To Be Confirmed During Implementation

Area	Project
Shiselweni region	Construct new feeders at Matsanjeni, Mhlosheni, Lavumisa, Hluthi and Verdun
Nhlangano	Construct 7 km Mink Interconnector (Gege - Mankayane)
Nhlangano	Uprate 30 km Gege feeder to Hare
Mhlosheni	Construct 2 km Mink Interconnector (with Lawuba feeder 4370)
Hluthi	Construct 6 km Mink Interconnector (with Hluthi feeders 4630 and 4650)
Hluthi	Uprate 20 km Gopher to Mink (Shisizwe areas)
Nhlangano	Intall remotely controlled reclosers
Hlatsikhulu	Construct feeder to supply Nkwene areas
Hlatsikhulu	Intall remotely controlled reclosers at Mtsambama and Mhlabuyaduma areas
Maloma	Install remotely controlled 11 kV breakers for feeder 1930 and 1940
Ncandweni	Uprate 3 km Gopher to Mink (Luhlonodlweni areas)
Nhlangano	Convert Nhlangano town overhead conductors to underground
Hluthi	Install remotely controlled reclosers at Mkhwakweni and Nsalitje areas
Nsoko	Construct feeder to supply irrigation load
Verdun	Construction of a five MVA 66/11 kV substations at Verdun switchyard

13. The activities will largely be carried out on brownfield sites with work on greenfield sites limited to short spans. Thus, outages will be coordinated within the broader work program of EEC to minimize the impact to customers. EEC will use existing channels to adequately communicate outages to enable customers plan for inevitable outages.

Component 2

14. The component will be implemented by EEC's REU focusing on the Shiselweni region and will help reduce the outstanding backlog of connection applications. This backlog comprises applications for which preliminary cost estimates have been completed by EEC.

15. The component will fund all costs up to the customer interface unit including the necessary MV and LV (11 kV and 0.4 kV) network, service drop, meter and breaker for group schemes approved by the MNRE. Customers will be responsible for household wiring and payment of the connection fee. Consumers pay an administration and connection fee of approximately SZL450 to EEC (approximately US$30) before a connection is made.

16. As under Subcomponent 1b, EEC will procure goods and labor for construction of the MV and low voltage network. To increase resilience, ABCs will be used in areas exposed to high winds to reduce the risk of outages from debris and clashing conductors.

17. The MNRE estimates that 15 – 20 percent of applicants under the group scheme in its program are unable to afford the cost of household wiring which is estimated to be a minimum of SZL1,500 (US$100). There is therefore an option for EEC to provide a 'ready board' – an integrated consumer interface unit that includes metering and power outlets of a total rating of 20 A – which eliminates the need to complete household wiring.

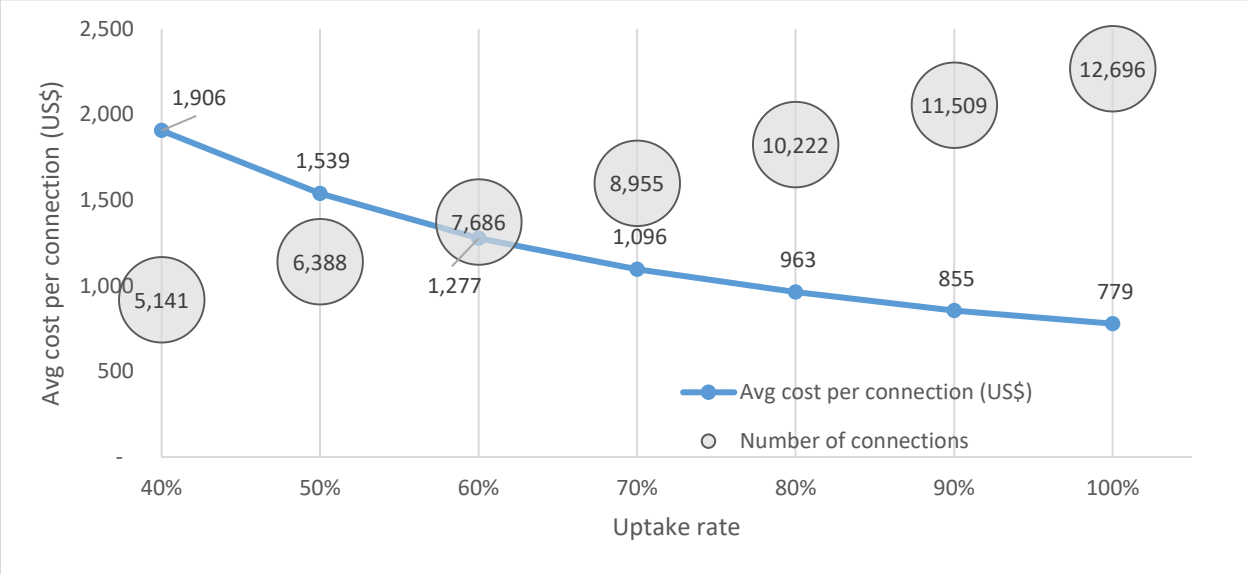
Connection costs have not been identified as a significant barrier to access but the MNRE intends to undertake an assessment to understand the magnitude of the challenge and evaluate the usage patterns of poor households.

18. The group schemes to be funded will be drawn from the backlog of applications in the Shiselweni region. Each group application is issued a unique ID. These ID numbers will be used to track progress toward the project's progress. The MNRE will verify data submitted with the application and assess readiness of the scheme for connection as one of the criteria in reviewing applications. Readiness is assessed by the number of households that have completed internal wiring. A 70 percent threshold is considered for readiness.

19. To ease implementation coordination and streamline supervision and M&E, connection programs under the MPCU and the Rural Development Fund will be redirected to other regions. This will limit the number of contractors working on access expansion in the Shiselweni region. To ensure adequate awareness, the SEP will be used to manage stakeholder expectations. The MNRE will verify completed works by EEC and jointly report on progress in connecting households.

20. The backlog from the MNRE shows a wide range of costs per connection from the various group schemes ranging from US$207 to US$6,087 per connection assuming a 100 percent uptake rate[22]. A subset of this has been selected based on the cost per connection. From this subset of quotations, the cost per connection ranges from US$207 to US$1,181 per connection. The average cost per connection is driven by the uptake rate and more than doubles assuming an uptake rate of 50 percent.

Figure 1.1: Variation of Average Connection Costs and Number of Connections with Uptake Rates



Source: World Bank with data from the MNRE (2018)

[22] The share of households that connect to the grid under the project

21. The project assumes a 60 percent uptake rate during project implementation because of the readiness assessment that the MNRE carries out before approving schemes and aims to connect approximately 8,000 households. According to the MNRE, most households mobilize funds to quickly complete wiring when construction of the network commences, and it can be expected that households will continue to connect after the project is closed.

Component 3

22. This component will finance technical assistance to (a) enhance electrification planning, implementation, monitoring and verification capacity at the MNRE, considering the GoKE's stated capacity of reaching universal access in the short-term; and (b) support the implementation of GoKE's policy positions as stated in NEP (2018) in general and specifically maximizing financing for development by enabling greater private sector participation in renewable energy generation and off-grid electrification. This component will also finance technical assistance to enhance the security of supply and support MNRE's capacity-building needs. The MNRE and ESERA are already advancing on the implementation of the NEP and the specific scope of support will therefore be tailored to the status of progress by the GoKE. Areas of support discussed and to be firmed up include the following:

a. **Geospatial electrification planning platform.** The platform will be a tool to help the GoKE take appropriate measures in providing and sustaining access to electricity. As the Government nears the universal access goal, there will be more nuanced measures that balances the overall goal with available technologies, expected use, and cost-effectiveness. The GIS electrification planning platform will be used to determine optimal approaches, such as private sector - led off-grid solutions and provide the basis for a National Electrification Plan.

b. **Operationalization of the REF**. The GoKE has established a REF that is currently capitalized by a levy on electricity sales. This activity will support the GoKE in finalizing the REF governance structure including modalities for disbursements (e.g. capital subsidies to local private sector off-grid electricity entrepreneurs), monitoring and additional replenishment.

c. **Competitive and transparent framework for procurement of renewable energy generation**. This activity will support the GoKE in operationalizing the recently promulgated[23] IPP policy to attract private sector grid-scale renewable energy developers.

d. **Improving gender balance in the energy sector**. This will support commitments for establishing targets for gender balance in the energy sector and yearly reporting on progress made, enhanced focus on empowering marginalized groups in the energy sector, and support the MNRE to provide input on energy issues in school curriculum together with the Ministry of Education.

[23] 2018

ANNEX 2: Summary of the rural electrification program

1. The delineation of responsibilities in the implementation of the GoKE's vision of universal access is defined among project funders, sponsors, and implementing agencies. MNRE has oversight of the energy sector in Eswatini and is responsible for ensuring that the Government's rural electrification goals are met. MNRE works with the RDF at the Ministry of Tinkhundla Administration and Development and the MPCU at the MoEPD[24] that act as funding agencies towards the REP in addition to the parliamentary appropriations that the MNRE receives for the program. EEC is implementing agency for the REP. In general,[25] funding covers the cost of works up to the customer interface including metering but excludes internal wiring which is the contribution that the customer makes toward the program. Consumers also pay an administration and connection fee of approximately SZL450 to EEC (approximately US$30) before a connection is made.

2. To obtain a connection, group schemes or individuals apply to EEC and pay an application fee of SZL33 (approximately US$2) for individuals and SZL173 (approximately US$12) for group schemes with five or more applicants. Based on the application, EEC estimates the costs of connection outlining the connection fee, administration fee, and capital contribution to service the application. Applicants can then pay this cost for immediate connection or use the quotation to seek support from the REP. Each quotation includes details of the applicant, geo-referenced location of the household(s), and a copy of the national identification card.

3. **The Group Scheme**: Community members seeking support for electrification under the REP can constitute a group to process the application. The group is represented by a nominated head and needs to be endorsed by the chief and Member of Parliament. This increases accountability and inclusion in the group. Members of the group contribute to the application fee and requests for support can be submitted to all three sponsoring agencies.

4. The MNRE estimates that 15- 20 percent of applicants under the group scheme in its program are unable to afford the cost of household wiring which is estimated to be a minimum of SZL1,500 (US$100). Therefore, there is also an option for EEC to provide a 'ready board' that eliminates the need for internal household wiring

5. **Funding sources**. The REP is funded by the GoKE through national budget appropriations and cooperating partners. Funds are channeled through the MNRE, RDF, and MPCU who work with EEC to implement connections across Eswatini. Table 2.1 shows the funding allocated toward the REP in 2016/17.

[24] Funds are not exclusive to rural electrification
[25] MNRE supports 100percent of the capital cost while MPCU and RDF finances 90% of the capital cost.

Table 2.1: 2016/17 Allocation of REP Funding

Agency	Funds received/allocated for rural electrification (SZL)
MNRE	45 million
*RDF	1 million
*MPCU	150 million
Total	**196 million**

Source : http://www.gov.sz/index.php?option=com_content&view=category&id=69

* Allocations are not entirely earmarked for rural households

6. It is expected that MPCU will progressively shift its focus away from rural electrification given the achievements recorded in increasing access to electricity services. This will increase the funding gap for electrification. Thus, GoKE has established a Rural Access Fund which has been capitalized since April 2017 through a levy on electricity tariffs to help cover part of the remaining access deficit. The MNRE is currently working with ESERA to operationalize the fund.

7. The specific responsibilities of MNRE, MPCU, RDF and EEC are outlined below.

8. **MNRE** applies for funding from GoKE and donors, which is transferred directly to EEC for project execution. MNRE only responds to requests from group schemes (defined as a minimum of 20 customers or households) and not those from individual customers. Requests for connections to MNRE typically originate from a nominated member of the group scheme.

9. Connection requests are assessed for readiness by MNRE to ensure that the request can be reasonably met in accordance with a predetermined list of requirements which includes the expected number of connections, distance from the nearest point of supply, terrain in the area, among others. The readiness assessment is also informed by the number of households who have completed internal wiring. Depending on the size and geographic proximity, groups are combined to reduce the unit cost of connections.

10. The MNRE does not maintain accounts for rural electrification. Once the application is verified and accepted, MNRE applies for financing from MoF, in coordination with the relevant funding source. Funds are then directly disbursed to EEC from the Central Bank on instruction MoF and EEC commences works.

11. Demand for connections under the REP has exceeded available resources and there is a backlog of connections across Eswatini with nearly 22,000 in the Shiselweni region alone as of December 2018. Unlike other funding agencies, the MNRE covers the entire capital contribution. This is therefore the preferred means of obtaining a service connection for the poorer households. Customers are expected to pay the connection and administration fees and also wire the household before a connection is completed, unless a ready board is preferred by the customer.

12. In recent years, M&E of the REP has not been undertaken to the extent planned by the MNRE due to inadequate capacity and resources, particularly for regular field visits for verification and audit purposes. However, MNRE coordinates rural electrification with the relevant government agencies and EEC. Coordination meetings are held at the commencement and completion of projects to ensure optimization in the application of the available funding. The completion meetings are held to verify completed works under the project.

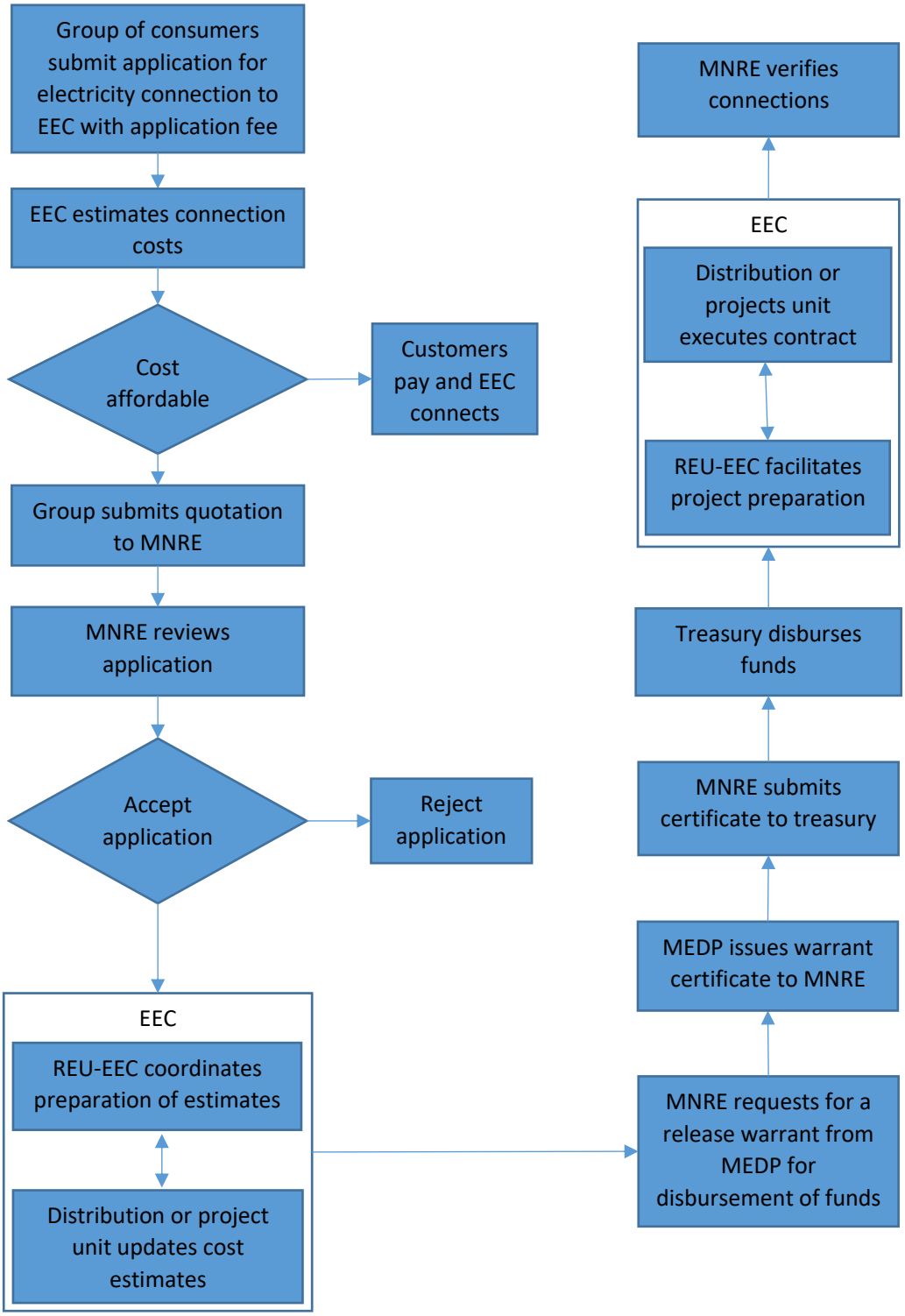
13. **MPCU** is a semi-autonomous unit of the MoEPD responsible for supporting self-development in communities through financing, supervision and evaluation of community based micro-scale projects of which rural electrification can be one. Unlike the MNRE that funds 100 percent of the capital contribution, the Micro Projects Program can grant up to 90 percent of the capital contribution and typically support applications estimated to cost less than SZL1 million. In addition, the minimum group size per application is 10 members. The MPCU also works with Rural Electrification Unit (REU) -EEC to implement its projects following a similar model as the MNRE.

14. **RDF** was established in 2000 to promote rural and regional development through the provision of grants to community members for income generating projects. The RDF grants up to 90 percent of connection costs to groups of 10 or more prospective consumers and works with REU-EEC to implement projects following a similar model.

15. **EEC** is the only agency responsible for implementing (procurement of materials and undertaking the physical works) the GoKE's REP through its REU. EEC receives requests for electricity connections from project sponsors (MNRE, MPCU, and RDF), coordinates the preparation of cost estimates for project sponsors to request funding, and, on disbursement of funds, and ensures that requested works are completed to the applicable standards.

16. Through this arrangement, EEC does not bear the capital costs of connecting customers because all connection costs are fully funded by the sponsors. Construction of the needed network extensions are either carried out in-house by EEC or contracted out for construction under EEC supervision. Through its annual budgets and work program, EEC is responsible for ensuring that the network is adequately maintained and expanded to be able to accommodate new connections. A flow chart of the application process for group schemes with the MNRE is shown in Figure 2.1.

Figure 2.1. Flow Chart for REP



ANNEX 3 Details of Economic and Financial Analysis

1. This annex presents the economic[26] and financial analysis of the ***Eswatini: Network Reinforcement and Access Project***. The analysis uses a cost-benefit framework to determine the development impact of the project and provides a rationale for public financing as the appropriate vehicle for its delivery. It also presents the value-added of World Bank's support and how it maximizes the development impact of staff efforts.

2. The analysis finds that the project is economically viable with an EIRR of 10.91 percent, and a an NPV of **EUR 31.70 million** (US$35.57 million) at 6 percent discount rate. The sensitivity analysis indicates that these results remain sufficiently robust under significantly higher cost and lower benefit scenarios.

PROJECT RATIONALE AND DEVELOPMENT IMPACT

3. The network in the southern part of Eswatini is currently served by 66 kV transmission lines and 11 kV distribution lines. The low capacity of the existing lines and the debilitated state of the network have resulted in low voltages and high technical losses. This has limited the ability of the network to support marginal demand growth from current and prospective consumers, consequently challenging the electrification efforts of the GoKE. The objective of the project is to improve the reliability of electricity supply and increase access to electricity services in targeted areas of Eswatini.

4. The project has two main components in addition to a technical assistance component and a zero-Euro CERC. These are: (a) reinforcement of the transmission and distribution grid; and (b) electricity access expansion.

5. The economic benefits of the project identified include the following:

a) Improvement in reliability and service quality in the Shiselweni area of Eswatini through improved outages and voltages.
b) Provision of electricity access to an estimated 8,000 households of which 54 percent of the anticipated beneficiaries are females.
c) Reduction in technical network losses.
d) Increased capacity of the network to support projected load growth.

6. The project also presents some direct and indirect benefits that are difficult to value, predict and quantify with the available information. These include the improvement in voltages and the impact of the project on economic activity. These benefits are thus discussed, but not included in the evaluation of project benefits.

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

METHODOLOGY: COST-BENEFIT ANALYSIS

7. This economic analysis follows a standard cost-benefit framework that compares the present value of incurred costs to the stream of attributable benefits. The EIRR and NPV informs the project's viability over its economic life-time assumed to be 30 years. Net benefits of the *Project* were calculated by comparing the economic costs and benefits of the 'with project' and 'without project' scenarios.

8. **Benefits.** EEC provided a load forecast for the project impact area which is estimated at approximately 7 percent of the total load of Eswatini, to grow at 2 percent per annum over the next 10 years and about 1.9 percent in the subsequent 20 years in the low case scenarios. However, additional load onto the existing network would pose a threat to the reliability of the grid and compromise the quality of supply to consumers. It would also worsen the level of technical losses and subsequently increase the cost of supply. A load flow simulation by EEC indicates that the project will prevent a further deterioration of the network and reduce the current technical losses by about 3 percent. It would also support the projected growth in demand, both organic and from electrification.

9. **Costs**. The main costs associated with the project are the (a) capital costs associated with the construction of a 132 kV line from Nhlangano II to Lavumisa; (b) capital costs associated with the construction of three new 132/11 kV transformers; (c) construction of a 132 kV line bay at Nhlangano II; (d) capital costs associated with the construction of feeders; (e) O&M costs associated with these investments; (f) civil works associated with these construction activities; and (g) project management and supervision costs.

ASSUMPTIONS UNDERLYING ANALYSIS

10. The benefits of the project set in from 2022 with the completion of the Nhlangano - Mhlosheni transmission line, the associated distribution upgrades, and the completion of the Mhlosheni Substation. Due to the need for additional network strengthening upon completion of the transmission line, it is assumed that only 30 percent of the targeted connections under Component 2 will be achieved at this time. Benefits accumulate as the project advances but are only considered in the evaluation of benefits after the commissioning of each phase. In 2025, when the project has been completed, the full benefits shall accrue. CAPEX is assumed to be drawn down over 2020 to 2025 at rates of 10 percent, 20 percent, 35 percent, 20 percent and 15 percent, which corresponds to the assumed implementation schedule.

11. An economic discount rate of 6 percent is utilized in the absence of a reliable growth projections of Eswatini beyond 2025 in accordance with World Bank guidelines.[27]

12. **WTP**. There is no WTP study available for Eswatini nor is there appropriate survey data on the consumption levels of alternate energy sources to facilitate the estimation of one. However, beneficiaries of the access component are approved applicants for electricity connections. Thus, the retail tariff paid by residential consumers is a good proxy for the lower bound of the WTP threshold for the project beneficiaries. Consequently, the WTP utilized in this analysis represents a conservative estimate of the project benefits to beneficiaries.

[27]The International Monetary Fund projects a growth rate of about 1.7 percent on the average from 2020 to 2025 but provides no projections beyond 2025.

13. **Consumption Levels**. The consumption of the new connections is estimated to be on tier 2 of the multi-tier framework at 0.36 MWh annually. Table 3.1 presents a summary of the key assumptions utilized in the economic analysis.

Table 3.1: Summary of Key Assumptions

Variable	Assumption
Project Life	30 years
Discount Rate	6%
Estimated losses reduction at the completion of project	3%
Contingencies	10% of capex
O&M Cost (percent of capex)	1%
WTP	EUR 126/ MWh
Consumption of new connections	0.36 MWh per year
Average demand growth	2 % in first 10 years and 1.8 % in subsequent 20 years

RESULTS

14. To assess the economic viability of the project, the stream of benefits from increased supply of electricity and reduced distribution losses are evaluated against the project capital and the O&M cost. The cost-benefit analysis, assuming a discount rate of 6 percent and accounting for taxes and contingencies in CAPEX, estimates an NPV of EUR 31.70 million (US$35.57 million), and an EIRR of 10.91 percent under the low case scenario of power flows.

Sensitivity

15. A switching value analysis was performed to test the robustness of the economic viability of the project to changes in the assumed values of key parameters. The results show that under the low case scenario under which the project analysis was conducted, the project remains viable until an increase in CAPEX by 82 percent. In relation to demand, power flow levels must be below 32 percent of projected levels for the project to become unviable. The net benefits of the project under the low case scenario of power flows were discounted at a 10 percent discount rate and the NPV was found to be EUR 3.39 (US$3.81 million). This indicates that the results of this analysis, based on the lowest growth forecast, lowest WTP estimate, and lowest consumption assumptions are highly conservative, further enhancing the robustness of our estimates.

ENVIRONMENTAL COST OF THE PROJECT

16. The preliminary ESIA identifies local and global environmental impacts of the project in the form of land clearing and GHG emissions from the supply of the new demand generated. The baseline for GHG accounting for Subcomponent 1a is based on a counterfactual from the scenarios in the pre-feasibility studies of EEC which considered a 66 kV line versus a 132 kV line. Emissions from losses reduction (or increases), land clearing and circuit breakers are calculated for the project and baseline, and their difference indicates the level of net emissions

from the project. Based on World Bank guidance on the social value of carbon,[28] there is a marginal revision of the project NPV with emissions to EUR 40.45 million (US$45.40 million) from the initial EUR 31.70 (US$35.57 million) NPV without environmental costs. The ERR also increased to 11.5 percent compared with 10.9 percent. Details of the breakdown are listed in the following paragraphs.

17. **Land clearing**. The total length of the transmission line is 87 km and with a right of way of approximately 30 m. The approximate area to be cleared is 261 h. The ESIA characterizes the vegetation to be highveld landscape from Nhlangano to Hluthi and lowveld through to Lavumisa. Thus, 58.62 percent of the total land cleared will be highveld and the remaining 41.38 percent lowveld. Based on this, the biological densities of tropical shrubland and tropical mountain systems have been used for the project. Land clearing emissions from the project is therefore estimated at 42,055 tCO_2e.The counterfactual (66kV line) has a lower right of way of 22 m requiring approximately 191.4 ha to be cleared resulting in emissions of 30,840 tCO_2e. Thus, the net emissions from land clearing is estimated at 11,215 tCO_2e.

18. **Circuit Breaker emissions**. A total of 12 closed pressure design SF_6 gas breakers are assumed. World Bank GHG accounting guidelines assumes kg SF6/kV to have a gas leakage percentage of 2.6 percent and Global Warming Potential of 23,900 tCO_2-e/tSF_6. Based on these assumptions, it is estimated that one 132 kV breaker is likely to emit 1230 tCO_2e over the project life of 30 years and one 66 kV will emit 615 tCO_2e over the same period.

19. **Emissions from losses reduction.** Net emissions are calculated by the difference in losses between a 132 kV line and a 66 kV line. Under the 66 kV counterfactual, losses reduction is about 50 percent of the loss reduction in the 132 kV scenario. Based on this, net emission reductions from losses are found to be approximately 56,145 tCO_2e.

20. **Emissions from Access Component**. Emissions from the access component is calculated based on the World Bank Guidance for electricity access project. The assumed annual consumption of 0.36 MWh per household corresponds to tier 2 demand. Baseline emission factor per household is thus 0.62745 tCO_2e per year. Based on a grid emission factor of 0.92 tons per MWh, net emissions from the access component over the economic life of the project is 70,919 tCO_2e.

21. Thus, the total net emissions for the project over its economic life is 108,469 tCO_2e. A summary of the results is included in Table 3.2.

[28]Carbon emission reductions are valued in the base case at US$30 per tCO_2e in 2015 and increasing to US$80 per tCO_2e in real terms by 2050.

Table 3.2: Summary of Relevant Assumptions for GHG Accounting

Variable	Unit Measure	**Project**	**Baseline**	**Net**
Component 1a				
Voltage	[kV]	132	66	
Right of way	[m]	30	22	
Cleared area	[ha]	261	191.4	70
Highveld:lowfeld		0.58:0.42	0.58:0.42	
Emissions per ha - highveld	[tCO2e/ha]	205	205	
Emissions per ha - lowveld	[tCO2e/ha]	103	103	
Number of breakers		12	12	-
Emissions per breaker over 30 years	[tCO2e]	1230	615	
Emissions from land clearing	*[tCO2e]*	*42,055*	*30,840*	11,215
Total emissions from breakers	*[tCO2e]*	*14,760*	*7,380*	7,380
Subcomponent 1a and 1b				
Total technical losses	[MWh]	466,850	527,738	(60,888)
Total additional demand	[MWh]	1,267,555	1,267,555	-
Grid emission factor[29]	[kg/MWh]	922	922	
Emissions from losses	*[tCO2e]*	*430,483*	*486,628*	(56,145)
Component 2				
Number of household connections		8000	8000	-
Emissions factor	[tCO2e/HH/y]	0.331956	0.62745	(0.30)
Emissions from access	[tCO2e]	79,669	150,588	(70,919)
Total emissions	[tCO2e]	566,967	675,436	(108,469)
Annual average emissions	[tCO2e]	18,899	22,515	(3,616)

22. The NPV of the project was calculated with low and high scenarios for the cost of carbon. Th NPV at a 6 percent discount rate increases to EUR 49.15 million (US$55.2 million) and EUR 40.45 **(US$45.40)** in the high and low case scenarios respectively. The ERR increases to 12.33 and 14.14 percent in the baseline carbon cost scenario and in the high case scenario.

FINANCIAL ANALYSIS

23. The financial analysis indicates that the project is financially viable with an FIRR of 32.1 percent, and an FNPV of EUR 16.29 million (US$18.31 million). These results remain robust under most sensitivity scenarios including reduced load flow from lower demand and increased capital, O&M, and generation costs.

24. In the financial analysis, the project generates cash inflows through additional sale of power from new demand by new and existing consumers. In addition, cost reduction from reduced technical losses reduces cash

[29] https://cdm.unfccc.int/methodologies/standard_base/2015/sb131.html

outflows and generates additional revenue by satisfying part of the new demand. On the other hand, cash outflows are through the capital investment costs, O&M costs, connection costs and cost of supply of additional demand engendered by the project.

25. The life of the assets is assumed to be 30 years with revenues from the projects beginning to flow from 2022 after the commissioning of the first phase of the project. Revenues from these additional sales are adjusted to the collection rates assumed to be 98 percent.

26. The CAPEX of the project is estimated at EUR 33 million (US$37 million) and O&M costs are estimated at 1 percent of capital costs and an average supply cost of EUR 80.1 per MWh. In addition, beneficiaries of the access component incur a connection and administrative cost of EUR 26.7 per connection.[30]

27. A financial discount rate (that is, Weighted Average Cost of Capital - WACC) is calculated to be 1.5 percent based on an 8/9 loan component and a 1/9 equity injection by the GoKE. The cost of equity is estimated to be 9.97 percent and the cost of debt is estimated to be 0.87 percent which is EURIBOR+1.25percent. The loan is assumed to have a grace period of five years corresponding to the implementation period. The amortization plan is assumed to be in level payments. Table 3.4 presents the summary of assumptions utilized in this analysis.

Table 3.3: Investment Costs and Disbursement Schedule (EUR millions)

	2020	**2021**	**2022**	**2023**	**2024**	**2025**
Assumed Capital Disbursements	3,560,000.00	7,120,000.00	12,460,000.00	7,120,000.00	5,340,000.00	
Assumed O&M Costs		37,000	111,000	240,500	314,500	370,000
Cost of generation	EUR 80.1MWh					
Connection costs	EUR 26.7 per connection					

[30] As bid submissions are made in nominal US$, the financial model includes the impact of US$ inflation during the construction period.

Table 3.4: Summary of Relevant Assumptions

Asset economic Life	30 years
US Inflation rates	1.9%
Corporate Tax rate	27.50%
EURIBOR RATE on May 5, 2019	-0.87%
Cost of debt	EURIBOR +1.25%
Cost of equity	9.97 %
Contingencies	10 % CAPEX
O&M cost (percent of capex)	1%
Average Retail Tariff (Domestic) (EUR/MWh)	106
Residential retail tariffs (EUR/MWh)	112
Average cost of Supply (EUR/ MWh)	80.1
Grace Period	5 years
Weighted average cost of capital - WACC	3.2%
Loan Maturity	20 years
Amortization plan	Level
Collection rates	98%

RESULTS

28. The project is financially viable with an FIRR of 32.1 percent and a FNPV of EUR 16.29 million at a financial discount rate of 1.5 percent. A sensitivity analysis on these results indicate that the project is vulnerable to increase in capital costs over 73 percent, demand growth rate below 40 percent of projected rates, and increase in O&M costs over 60 percent. Thus, the financial viability of the project remains sufficiently robust to significant cost overruns and has a good level of resilience under several sensitivity scenarios.

ANNEX 4: Implementation Arrangements and Support Plan

Project Institutional and Implementation Arrangements Design

INSTITUTIONAL SETUP

1. The project will be implemented over a five-year period and will utilize existing government structures to meet the project's objectives. The IBRD loan will be to the Kingdom of Eswatini, through the Ministry of Finance. Given the role of EEC in the electricity supply industry as the national utility, the overall fiduciary responsibility for the project will be vested with EEC. The key institutional actors in the electricity sector include MNRE, EEC and ESERA.

2. MNRE is responsible for policy formulation and has overall oversight over the electricity supply industry in Eswatini. ESERA is the regulatory body for the electricity supply industry and was established by the Energy Regulatory Act (2007). The core mandate of ESERA includes the issuance of licenses for power generation, transmission, system operation, distribution, supply, import, and export. Under the government's electrification program, the delineation of responsibilities is defined among project funders, sponsors, and implementing agencies.

3. MNRE is the primary agency responsible for ensuring that the government's rural electrification goals are met. MNRE, through its Department of Energy, works with the Rural Development Fund (RDF) at the Ministry of Tinkhundla Administration and Development and the Micro Project Coordination Unit (MPCU) at the Ministry of Economic Planning and Development[31] that act as funding agencies towards the REP in addition to the parliamentary appropriations that MNRE receives for the program. EEC is the implementing agency for the government's REP and shall also be the implementing agency for the Project.

4. As the Project Implementation Agency, EEC will manage the project on behalf of GoKE and, in this regard will be responsible for project fiduciary aspects. In maintaining the existing structures, the Ministry of Finance will on-lend funds for Component 1 to EEC and on-grant funds for Components 2 and 3 to EEC. The on-granting arrangement follows the existing structure for GoKE's REP under which EEC does not bear the capital costs for rural electrification. Furthermore, since Component 3 will fund activities at the MNRE, the funds related to this shall also be on-granted to EEC.

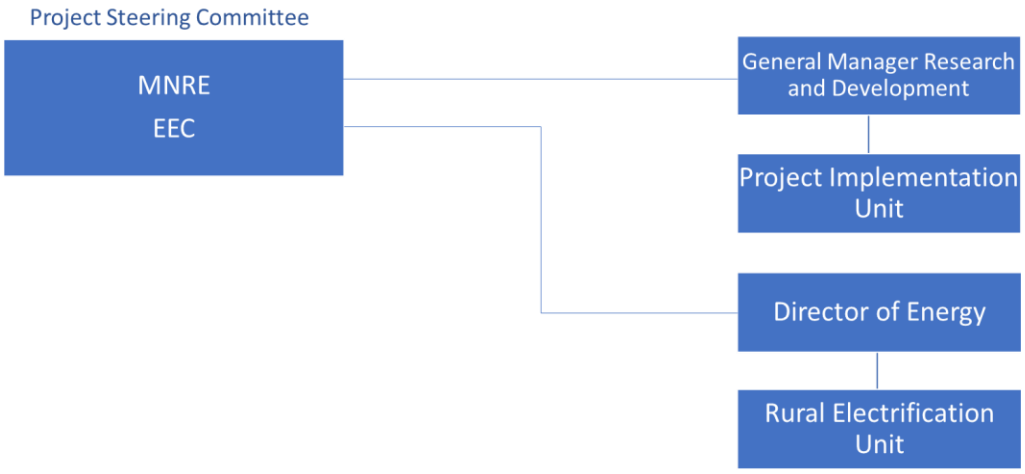
5. EEC has experience in executing capital projects and implementation of Component 1 will be familiar to EEC. Under Component 2, MNRE will be responsible for selecting the group schemes to be funded. This will involve field visits to verify application data and assess the readiness of the scheme for support under the REP. Approved group schemes will be submitted to EEC for construction and connection. MNRE will also validate connections completed under the project through routine field visits and audits, and report progress to the World Bank through the PIU.

[31] Funds are not exclusive to rural electrification

6. Activities under Component 3 will be closely coordinated between the PIU and MNRE that will develop the program of activities and applicable terms of reference and submit these to the PIU for the procurement of goods and services. MNRE will be responsible for the quality of the outputs under the Component.

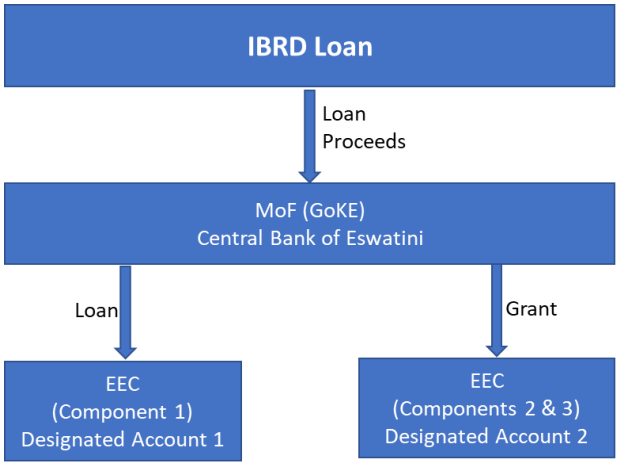
7. A PSC, comprising MNRE and EEC, will ensure adequate coordination and provide overall policy guidance during project implementation.

Figure 4.1: Project governance structure



8. The PIU in EEC will be responsible for the preparation and physical implementation of project. This unit will be under the oversight of the General Manager, Research and Development, comprising the following staff: Project Manager; Procurement Officer; Transmission and Substations Engineer; Social Development Officer; and an Environmental Officer. EEC will allocate a specific staff member within the Finance Division, with responsibility for the project's FM and reporting in close coordination with the Project Manager. The PIU will also work closely with MNRE in the implementation of Components 2 and 3 of the project.

Figure 4.2: Flow of funds



9. **Disbursement arrangements**. The project will use the Advance disbursement method whereby withdrawals from the loan account will be deposited in the Designated Account for payment of the World Bank-financed eligible expenditures. Disbursements from the Loan Account will be based on quarterly IFR documentation to be prepared by EEC and submitted to MoF for approval and submission to the Bank. For withdrawal from the loan account, EEC will be responsible for preparing the withdrawal applications and submitting them for approval to the MoF, supported by IFRs, within 45 days of the end of each reporting period.

10. The project will also have the option of using the: (a) Direct Payment disbursement method involving direct payment from the Loan Account on behalf of the utility to suppliers of goods and services that have a value above a set threshold; and (b) Reimbursement disbursement method, whereby the utility makes payments for the World Bank eligible expenditures and submits withdrawal application for reimbursement. Upon the effectiveness of the Loan Agreement and submission of a withdrawal application, the World Bank will disburse an amount equivalent to six months expenditure into the Designated Account. Subsequent disbursements will be based for six-monthly estimated expenditure, taking into account the balance in the Designated Account at the end of the reporting period.

11. To aid implementation readiness, the project will allow retroactive financing for engineering studies and environmental and social standards activities. The retroactive financing shall be up to an amount not exceeding EUR 900,000 (US$1 million equivalent) under Category 1 of the disbursement procedures, and eligible payments may be made before the signing of the Loan Agreement and on or after April 15, 2019. Withdrawal categories are shown in Table 4.1.

Table 4.1 Withdrawal categories

Category	**Amount of the Loan Allocated (expressed in EUR)**	**Percentage of Expenditures to be financed (inclusive of Taxes)**
(1) Goods, works, non-consulting services, consulting services, Training Costs and Incremental Operating Costs under Parts 1, 2 and 3 the Project	35,610,750	100%
(2) Front-end Fee	89,250	Amount payable pursuant to Section 2.03 of this Agreement in accordance with Section 2.07 (b) of the General Conditions
(3) Interest Rate Cap or Interest Rate Collar premium	0	Amount due pursuant to Section 4.05 (c) of the General Conditions
(4) Emergency Expenditures under Part 4 of the Project	0	100%
TOTAL AMOUNT	**35,700,000**	

FINANCIAL MANAGEMENT

12. The World Bank conducted an FM assessment of EEC as required by the World Bank's IPF policy on Financial Management. EEC will be the implementing entity for the proposed Network Reinforcement and Access Project. The main objective of the assessment - which included a review of the budgeting, accounting, internal controls, flow of funds, financial reporting, auditing arrangements at EEC, and completion of FM assessment questionnaire by some officials of the entity, was to ensure that acceptable FM arrangements are in place for the implementation of the project.

13. Acceptable FM arrangements ensure that:

- Funds are used for the intended purposes in an efficient and economical way,
- All transactions and balances are correctly recorded to support preparation of regular and reliable financial statements that are subject to auditing arrangements acceptable to the World Bank; and
- Internal controls are considered capable of safeguarding the entity's assets.

14. EEC and the Government through the MNRE will implement the project. EEC's Finance Unit will be responsible for the FM aspects of the project implementation. EEC is wholly owned by the Government and is engaged in the business of generation, transmission, and distribution of electricity in Eswatini.

15. Table 4.2 shows the identified FM risks, the proposed mitigation measures, and conclusions on the risk rating.

Table 4.2: FM Risk Mitigation Assessment

Risk	Rating	Risk Mitigation Measures	Residual Risk	Negotiation/ Effectiveness Condition (Y/N)
Entity Level The entity responsible for the FM of the project is not familiar with the World Bank and therefore has limited knowledge of the World Bank's FM and Disbursement policies and procedures.	M	The World Bank will conduct a comprehensive training on the World Bank's FM and Disbursement policies and procedures by effectiveness of the Loan Agreement. Staff in the Finance and the Internal Audit Units will be encouraged to participate in the World Bank's periodic training program in FM and disbursement, and in courses organized by World Bank-recognized training institutions.	M	N

Risk	Rating	Risk Mitigation Measures	Residual Risk	Negotiation/ Effectiveness Condition (Y/N)
Project Level Variations to the project scope and supplier price variations might affect the budget estimates	M	Through review of the project scope against the desired objective and sign off by both parties. Contingent budget provision for unavoidable variations will be set and closely monitored.	M	N
Control Risk Budgeting: Due to the nature of the project, the risk that budget process may not be based on realistic cost estimates and procedures for approvals and variations may not be clearly laid out.	M	EEC procurement procedures provides guidelines on scope and variations of the projects. Variations are approved by management tender committee and Board tender committees.	M	N
Accounting No identified risk at this stage. EEC prepares monthly financial statements reviewed by the Audit Committee of the Board. EEC uses the Ellipse 8.4 accounting software, which can produce the required financial reports. The Finance Unit is headed by the professionally qualified accountant with sound track record in finance.				N

Risk	Rating	Risk Mitigation Measures	Residual Risk	Negotiation/ Effectiveness Condition (Y/N)
Internal Controls and Staffing The risk that accounting policies and procedures may not be followed consistently might weaken the control environment. The initial FM assessment has indicated that the staffing arrangements are still adequate to manage the project, although the arrangements will be monitored and adjusted throughout the project implementation.	M	EEC has an effective Internal Audit Unit. The Internal Audit Unit has unrestricted access to the Chairman of the Audit Committee. The review of the internal audit reports has indicated a healthy internal control environment.	M	N
Funds Flow No identified risk, funds will flow into the segregated Designated Accounts for payments of project activities.			L	N
Financial Reporting No identified risk. The entity is preparing quality management reports for internal monitoring.				N
Auditing No specific audit risk, EEC is mandated by its establishing acts to produce annual audited financial statements				N
Overall FM Risk Rating	M	The overall FM residual risk is 'Moderate'. The country, entity, and project levels inherent risks are mitigated by the use of EEC's FM system, are assessed as satisfactory for the implementation of the project, and the functioning oversight arrangements are provided by the MNRE and MoF.	M	

Risk Rating: H (High), S (Substantial), M (Moderate), L (Low)

16. **Major strength**. The project FM is strengthened by adequate qualified accounting staff, effective internal and external auditing arrangements and the noted timely production of the financial statements and audits thereof within the acceptable period.

17. **Weaknesses and action plan**. EEC and the MNRE have no experience in the implementation of World Bank financed projects. The World Bank's FM specialist will deliver workshops on the World Bank's FM and disbursement policies and procedures, including reporting requirements. Support will also be provided until EEC is conversant with all the required rules.

18. **Budgeting**. The budget cycle starts in October, the preceding year, where capital budgets are prepared based on the five-year medium-term plan. Capital budget holders are required to revise their existing five-year capital budgets and make changes where necessary. Consolidated capital budgets are reconciled with the EEC Master Plan whose custodian is the Research and Development Department. The budgets are presented for approval by the Project Approval Committee. Variations are submitted for Board approval through the Finance Committee. These procedures are assessed to be adequate for project implementation.

19. **Accounting**. EEC Finance Unit is headed by the General Manager, Finance, a professional chartered accountant. EEC uses the Ellipse 8.4 accounting software and the financial statements are prepared in accordance with International Financial Reporting Standards. The systems are adequate to record and report on uses of the project funds.

20. **Staffing**. The Finance Department has 54 established position, of which 52 were filled at the time of the project appraisal. The senior and middle management positions are filled with experienced professionals. The Business Support Manager will be responsible for all accounting matters of the project.

Internal control and internal audit arrangements

21. **Internal control**. Approval and authorization controls are documented in the policies and procedures manual and compliance therewith is monitored by well-experienced accounting staff. The financial and accounting policies and manuals, including the payment, purchasing manual, and procedures for stock purchasing and payments processing, will be adopted for the project.

22. **Internal audit**. The Internal Audit Department is headed by the Head of Internal Audit and supported by three internal auditors. The Head reports to the Board functionally, through the Internal Audit Committee, and to the Managing Director administratively. The department has six established positions. The review of audit committee charter, internal audit charter and internal audit manual gives assurance that this oversight function can be relied upon. The review of two randomly selected reports in the financial year 2017/2018 indicated a need for improvement in the project management processes of EEC. This risk will need to be managed during the implementation.

Financial Reporting

23. The project will produce and submit unaudited IFRs to the World Bank on a quarterly basis. These reports are designed to provide detailed and timely information to the project management, the coordination committee, the MoF, and the MNRE, and will include the following:

(i) A narrative summary of the project implementation highlights
(ii) Sources and uses of funds by disbursement categories
(iii) Uses of funds by project component/activity - both actual and cumulative
(iv) The Designated Account activity statement
(v) Summary of payments made for contracts subject to the World Bank's prior review
(vi) Summary of payments made for contracts not subject to the World Bank's prior review.

24. The accounting systems at EEC can produce these quarterly reports. The reports will be submitted to the World Bank within 45 days of the end of the reporting period.

Auditing Arrangements

25. **Audited financial statements**. EEC's financial statements will be acceptable to the World Bank without a requirement for a separate audit report for the project. The auditors will, however, express an opinion on the quality of IFRs produced and submitted to the World Bank during the period covered by the audit. The financial statements will also include a summary of all the withdrawals from the loan account during the period with assertion that the loan proceeds had been used for the intended purposes and in accordance with the World Bank Legal Agreements. The Government will prepare the audit terms of reference in consultation with the World Bank to ensure adequate coverage of the scope of the audit.

26. Table 4.3 identifies the audit reports that are required to be submitted to the World Bank by the Government and the due date for submission.

Table 4.3: Audit Reports

Audit report	Due date
Continuing Entity Financial Statements – April - March (EEC)	September 30 each year
Special opinion on the: (i) quality of the IFRs used for withdrawal from the Loan Account (ii) Operation and usage of the DA (iii) Delivery of specified/agreed output/services- of the project	As part of the annual audit report

Governance and Accountability

27. During the assessment process, it was found that the Head of Internal Audit and the external auditors had unlimited access to the Chairman of the Board. The Internal Audit Director also had access to the audit committee, the Board, or directly, depending on the issues at stake.

Conclusion

28. Based on the proposal to use EEC FM system for accounting and reporting the project receipts, expenditures, and asset management, including commitments, the overall conclusion of the assessment of the system is that the proposed FM arrangements meet the World Bank's IPF Policy minimum requirements for FM.

PROCUREMENT

29. All procurement to be financed under the project will be carried out in accordance with the World Bank Procurement Regulations for IPF Borrowers (dated July 2016), revised November 2017 and August 2018, and the provisions stipulated in the Legal Agreement. Project procurement will be carried out by the procurement unit of EEC. The project will carry out implementation in accordance with the 'Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD and IDA and Grants', dated July 1, 2016 (the Anticorruption Guidelines).

30. A procurement capacity and risk assessment was carried out by the World Bank for EEC to review the organizational structure for implementing the project and the interaction between the project's staff responsible for procurement duties and management of the commission. The Procurement Risk Assessment and Management System (PRAMS) was finalized. An assessment of the current procurement unit under the EEC identified the following key issues: (a) lack of procurement planning may lead to implementation delays; (b) little involvement of the procurement staff in contract monitoring may impede speedy resolution of contract matters; (c) non-monitoring of complaints may impede speedy resolution of the same; and (d) the current procurement unit staff have no experience with World Bank procurement procedures. Based on the assessment and taking note of the role and responsibility of the EEC for procurement, the procurement risk rating is 'Substantial'. The EEC will require strengthening of its procurement and contract management capacities.

31. To mitigate these risks, hiring of a procurement specialist with experience in infrastructure procurements will be completed and a contract management plan will be established for major contracts. Training will also be provided to new and current staff on the World Bank Procurement Regulations and contract management.

32. A Project Procurement Strategy for Development (PPSD) was developed to determine the approach to market, the selection methods, evaluation options, and sustainability considerations that may need to be included.

33. EEC has prepared a Procurement Plan. The Plan will be uploaded into the new Systematic Tracking of Exchanges in Procurement (STEP) system, a planning and tracking system that will provide data on procurement activities, establish benchmarks, monitor delays, and measure procurement performance. The Procurement Plan includes (a) a brief description of the activities/contracts to be procured during the first 18 months of project implementation, (b) the approach to market and selection methods to be applied, (c) the cost estimates, (d) time schedules, and (e) the World Bank's review requirements. Procurement arrangements for the CERC will be described in the CERC operational manual.

34. High-risk and high-value procurements will be identified for increased contract management support and indicated in the Procurement Plan. EEC will develop key performance indicators (KPIs) for such identified contracts and the KPIs will be monitored during the actual execution of contracts. The World Bank team will provide

additional due diligence and independent review of the contract performance of such identified procurements. A fully staffed project team of the EEC will be responsible for overall project/contract management with support of the Owner's Engineer.

35. The Eswatini Public Procurement Act 2011 has been assessed and indicates that the country's regulations are generally consistent with international best practice, although some weaknesses were identified, which should be mitigated through adequate measures to ensure that (a) contract documents have an appropriate allocation of responsibilities, risks, and liabilities; (b) contract award is published; and (c) the national regulations do not preclude the World Bank from its rights to review procurement documentation and activities under the financing.

36. The request for bids/request for proposals document shall require that bidders/proposers submitting bids/proposals present a signed acceptance at the time of bidding, to be incorporated in any resulting contracts, confirming application of, and compliance with, the World Bank's Anticorruption Guidelines, including without limitation, the World Bank's right to sanction and the World Bank's inspection and audit rights.

37. With the incorporation of the abovementioned provisions, the Eswatini Public Procurement Act will be acceptable to be used under those procurements using the open national approach not subject to the World Bank's prior review as agreed with the World Bank in the approved Procurement Plan. EEC has received authority from the Eswatini Public Procurement Regulatory Authority to derogate from the Public Procurement Act 2011 and follow the World Bank Procurement procedures when procuring under this project.

38. **Procurement of works.** This includes procurement of construction of approximately 90 km of 132kV transmission lines including substations, and constructions of feeders and household connections. It is envisaged that the large works packages will be procured through an open international approach to the market.

39. **Procurement of goods.** Goods to be procured under this project will include electrical supplies.

40. Procurements while approaching the international market will be done using the World Bank's standard procurement documents. Procurements while approaching the national market will be done using the national standard bidding documents, subject to incorporation of the abovementioned provisions, with an additional annex to address the World Bank's Anticorruption Guidelines and ensure universal eligibility.

41. **Procurement of consultancy services.** Consulting services to be procured under the project include hiring of firms to carry out studies, assessments, designs, and supervision of works and related activities. Hiring of individual consultants will be limited to any international consultant(s) required for project implementation. EEC has initiated the advanced procurements for selection of consultants to undertake engineering studies and an ESIA. The procurement processes followed for the selections has been consistent with the provisions of the Procurement Regulations for IPF Borrowers and will be considered for funding under the project.

42. **Operating costs.** These items will be procured using the borrower's national procurement and administrative procedures acceptable to the World Bank, including selection of project implementation support personnel.

43. **Record keeping.** All records pertaining to award of bids, including bid notification, register pertaining to sale and receipt of bids, bid opening minutes, bid evaluation reports and all correspondence pertaining to bid evaluation, communication sent to/with the World Bank in the process, bid securities, and approval of invitation/evaluation of bids would be retained by the EEC and also uploaded in STEP.

44. **Disclosure of procurement information.** The following documents shall be disclosed: (a) a Procurement Plan and updates; (b) an invitation for bids for goods and works for all contracts; (c) request for expression of interest for selection/hiring of consulting services; (d) contract awards of goods, works, and non-consulting and consulting services; (e) a monthly financial and physical progress report of all contracts; and (f) an action taken on the complaints received on a quarterly basis.

45. The following details shall also be published on the United Nations Development Business online and the World Bank's external website: (a) an invitation for bids for procurement of goods and works following open international market approaches, (b) request for expression of interest for selection of consulting services following open international market approaches, and (c) contract award details of all procurement of goods and works and selection of consultants using open international market approaches.

46. **Fiduciary oversight by the World Bank.** The World Bank shall prior review contracts according to the prior review thresholds set in the PPSD/Procurement Plan. All contracts not covered under prior review by the World Bank will be subject to post review during implementation support missions, including missions by consultants hired by the World Bank or through supreme audit institutions as part of the financial audit. The World Bank may, at any time, conduct independent procurement reviews of all the contracts financed under the credit.

47. **Contract Management.** High-risk and high-value procurements will be identified for increased contract management support and indicated in the Procurement Plan. The EEC will develop key performance indicators (KPIs) for such identified contracts and the KPIs will be monitored during the actual execution of contracts. The World Bank team will provide additional due diligence and independent review of the contract performance of such identified procurements. A fully staffed project team of the EEC will be responsible for overall project/contract management.

MONITORING AND EVALUATION

48. The PIU will be responsible for monitoring the project's implementation progress outlined in the Results Framework that defines specific outcomes and results. Progress reports will be prepared on a quarterly basis. Monitoring and evaluation (M&E) procedures in accordance with the Project Implementation Manual which will guide overall M&E activities. Activities to be monitored include the timely and efficient construction and commissioning of works under the project, quality control, processing of payments to contractors approved by the owner's engineer, the effective implementation of the Environmental and Social Management Plan (ESMP), the Resettlement Action Plans (RAPs) of the project, and the successful completion of the capacity-building activities.

49. The outputs of activities under Component 3 will also be collected and documented by the PIU, based on the list of output indicators specified in the project's Results Framework. In addition, the World Bank will carry out routine reviews of procurements financed by the project, undertake regular project implementation support missions, and review financial management monitoring reports and quarterly implementation progress reports provided by EEC, among others. The implementation progress and results monitoring data collected by the PIU

will inform the joint evaluation of project performance by GoKE, EEC, and the World Bank during regular project implementation support missions, at midterm, and at project closing.

STRATEGY AND APPROACH FOR IMPLEMENTATION SUPPORT

50. The strategy for implementation support was developed to reflect the nature of the project and its risk profile. The objective is to make implementation support to the client flexible, efficient, and focused on the risk mitigation measures defined in the project risk summary. Implementation support will include the provision of capacity strengthening in procurement, FM and governance, and anticorruption.

51. **FM**: The objective of the FM support is to ensure the continued adequacy of the borrowers' FM arrangements, compliance with relevant legal covenants of the financing agreement, and that the funds are used only for the purposes for which the funds were intended, with due regard to economy and efficiency. Based on the project's 'Moderate' FM risk rating, the World Bank will carry out the onsite FM support of the project twice a year. In addition, the World Bank's FM specialist will carry out desk-based quarterly review of the IFRs and the annual audit reports.

52. **Procurement**: Implementation support for procurement will include (a) providing training to EEC PIU staff; (b) reviewing procurement documents and providing timely feedback to the PIU; (c) providing detailed guidance on the World Bank's procurement guidelines to the procurement specialists who have focused on ensuring procurement readiness of first year contracts; and (d) monitoring procurement progress against the detailed Procurement Plan which will be updated regularly to reflect project implementation needs and improvements in institutional capacity.

53. **Environmental and Social Standards:** EEC Has already prepared and disclosed the preliminary ESIA along with draft Resettlement Policy Framework, draft Labor Management procedures and draft Stakeholder Engagement plan on their website and notified through a local newspaper (Times of Eswatini) on April 23, 2019. The ESCP summarizes the material measures and actions that are required as well as the timing of the material measures and actions. EEC is responsible for compliance with all requirements of the ESCP even when implementation of specific measures and actions is conducted by the Ministry, or other agencies. The World Bank's implementation support will include continued training to the PIU and the World Bank's ESF. Regular monitoring reports on the implementation of environmental and social safeguards will be provided to the World Bank for approval. These reports will be verified during project implementation support missions, which will include environmental and social standards experts.

Table 4.4. Implementation Support Plan

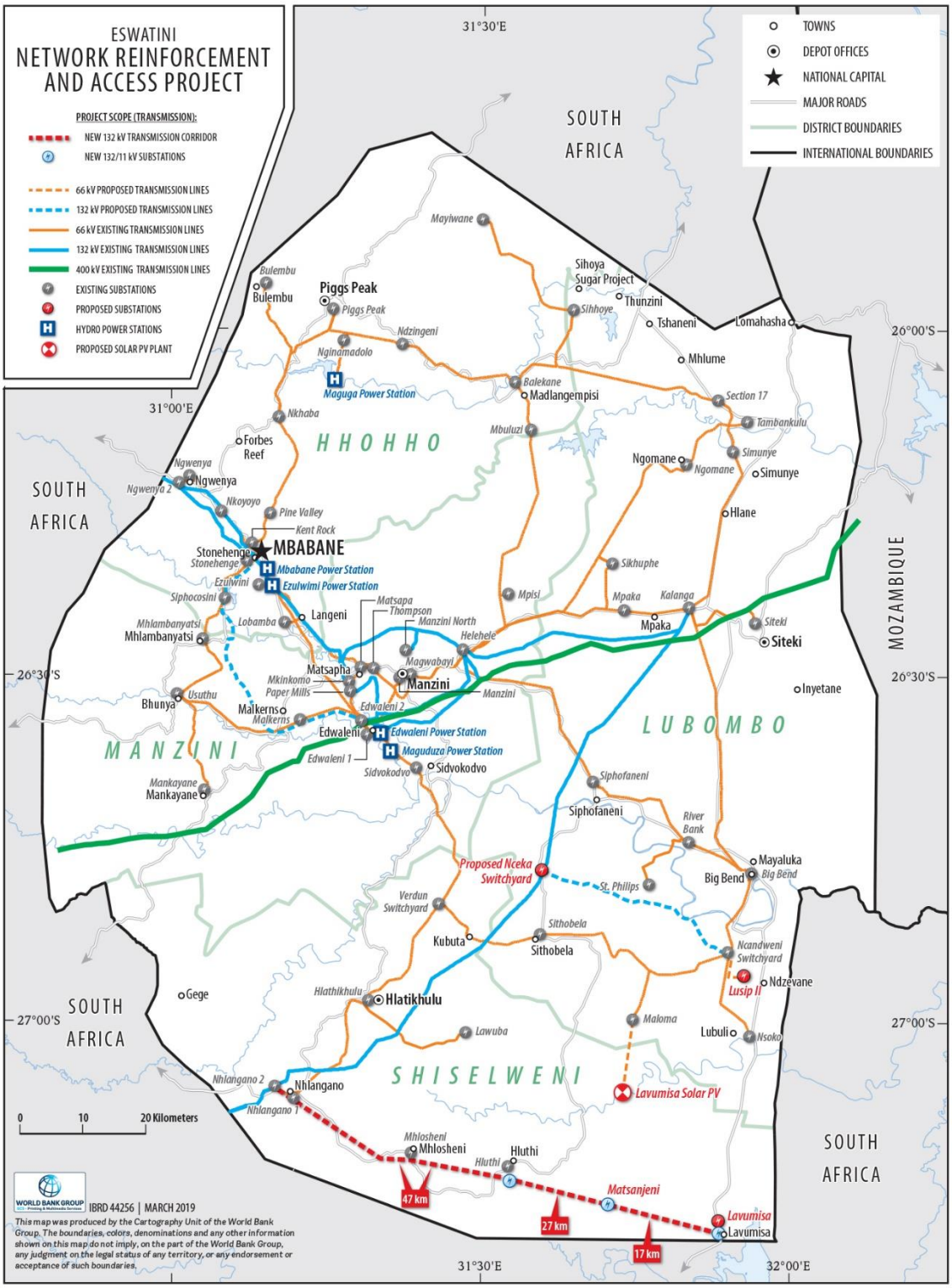
Time	Focus	Skills Needed	Resource Estimate	Partner Role
First 12 months	(a) Institutional capacity enhancement at the project level to strengthen project implementation systems (b) Technical advice to support project implementation (c) Implementation of environmental and social standards and FM/Procurement system for PIUs	Technical and procurement expertise Environmental and Social standards; FM/Procurement	US$150,000[a]	Close coordination and supervision of implementation activities between EEC and MNRE is required to ensure smooth contracting and contract management
12–60 months	Technical support Environmental and Social standards support M&E support Procurement and FM support	Power Engineer Task team leader Environmental specialist Social Development Specialist Procurement/FM specialists	US$600,000	Close coordination and supervision of implementation activities between EEC and MNRE is required to ensure smooth contracting and contract management

Note: a. Project implementation support missions will be combined and aligned, to the extent possible, with those of other energy projects, to enable cost-sharing benefits.

Table 4.5. Skills Mix Required

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
• Project management (Task leader) • Power Engineer • Off-grid/mini-grid • Environment • Social development • Economic / Financial Analyst • Monitoring • Procurement • Financial Management • Energy specialist • Administrative support	7–10 weeks per year across the team	• 3 per year • 2 per year • 1 per year • 3 per year • 3 per year • 1 per year • 2 per year • 2 per year • 2 per year • 3 per year • In pretoria and from HQ	To be adjusted annually depending on available budget and implementation progress.

ANNEX 5: Map


ESWATINI
NETWORK REINFORCEMENT AND ACCESS PROJECT
PROJECT SCOPE (TRANSMISSION):
NEW 132 kV TRANSMISSION CORRIDOR
NEW 132/11 kV SUBSTATIONS
66 kV PROPOSED TRANSMISSION LINES
132 kV PROPOSED TRANSMISSION LINES
66 kV EXISTING TRANSMISSION LINES
132 kV EXISTING TRANSMISSION LINES
400 kV EXISTING TRANSMISSION LINES
EXISTING SUBSTATIONS
PROPOSED SUBSTATIONS
HYDRO POWER STATIONS
PROPOSED SOLAR PV PLANT
TOWNS
DEPOT OFFICES
NATIONAL CAPITAL
MAJOR ROADS
DISTRICT BOUNDARIES
INTERNATIONAL BOUNDARIES
SOUTH AFRICA
MOZAMBIQUE
HHOHHO
MANZINI
LUBOMBO
SHISELWENI
MBABANE
Mayiwane
Bulembu
Piggs Peak
Sihoya Sugar Project
Sihhoye
Thunzini
Tshaneni
Lomahasha
Ndzingeni
Nginamadolo
Maguga Power Station
Mhlume
Balekane
Madlangempisi
Section 17
Tambankulu
Nkhaba
Mbuluzi
Forbes Reef
Ngwenya
Ngwenya 2
Nkoyoyo
Pine Valley
Kent Rock
Stonehenge
Mbabane Power Station
Ezulwini
Ezulwini Power Station
Siphocosini
Ngomane
Simunye
Hlane
Sikhuphe
Mpisi
Mpaka
Kalanga
Siteki
Matsapa
Thompson
Manzini North
Helehele
Langeni
Lobamba
Mhlambanyatsi
Magwabayi
Manzini
Mkinkomo
Paper Mills
Usuthu
Bhunya
Malkerns
Edwaleni 2
Edwaleni
Edwaleni Power Station
Maguduza Power Station
Edwaleni 1
Sidvokodvo
Inyetane
Mankayane
Siphofaneni
River Bank
Mayaluka
Big Bend
Proposed Nceka Switchyard
St. Philips
Verdun Switchyard
Kubuta
Sithobela
Ncandweni Switchyard
Lusip II
Ndzevane
Gege
Hlathikhulu
Hlatikhulu
Maloma
Lubuli
Nsoko
Lawuba
Nhlangano 2
Nhlangano
Nhlangano 1
Lavumisa Solar PV
Mhlosheni
Hluthi
Matsanjeni
Lavumisa
47 km
27 km
17 km
0 10 20 Kilometers
IBRD 44256 | MARCH 2019
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31°30'E
32°00'E
26°00'S
26°30'S
27°00'S