THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

FOR OFFICIAL USE ONLY

Report No: PAD3035

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A
PROPOSED IDA GRANT
IN THE AMOUNT OF SDR 30.6 MILLION
(US$42.0 MILLION EQUIVALENT)

AND A
PROPOSED GRANT
IN THE AMOUNT OF US$24.0 MILLION EQUIVALENT
FROM THE NORWAY'S SUPPORT TO THE REGIONAL POWER INFRASTRUCTURE PROJECTS
IN SOUTHERN AFRICA SINGLE DONOR TRUST FUND

TO THE
REPUBLIC OF MOZAMBIQUE

AND A
PROPOSED IDA CREDIT
IN THE AMOUNT OF SDR 11.0 MILLION
(US$15.0 MILLION EQUIVALENT)

TO THE
REPUBLIC OF MALAWI

FOR THE

MOZAMBIQUE - MALAWI REGIONAL INTERCONNECTOR PROJECT

August 26, 2019

Energy and Extractives Global Practice
Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective {July 31, 2019})

Currency Unit =	New Mozambican Metical (MZN) and Malawian Kwacha (MWK)
US$1 =	MZN 61.3499
US$1	MWK 744.9788
US$1 =	SDR 0.72705065

FISCAL YEAR
Government of the Republic of Mozambique: January 1 - December 31
Government of the Republic of Malawi: July 1 – June 30

Regional Vice President:	Hafez M. H. Ghanem
Regional Integration Director:	Deborah L. Wetzel
Country Directors:	Mark R. Lundell, Bella Bird
Senior Global Practice Director:	Riccardo Puliti
Practice Manager:	Sudeshna Ghosh Banerjee
Task Team Leaders:	Dhruva Sahai, Zayra Romo, Claudio Miguel Jamisse Buque

ABBREVIATIONS AND ACRONYMS

AACSR	Aluminum Alloy Conductor, Steel Reinforced
ACSR	Aluminium Core, Steel Reinforced
AfDB	African Development Bank
CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditure
CAPP	Central African Power Pool
CAS	Country Assistance Strategy
CPF	Country Partnership Framework
CTRG	*Central Térmica de Ressano Garcia* (Ressano Garcia Thermal Power Plant)
CTT	*Central Térmica de Temane* (Temane Thermal Power Plant)
DA	Designated Account
DRC	Democratic Republic of Congo
DSCR	Debt Service Coverage Ratio
EAPP	East African Power Pool
EBIT	Earnings Before Interest and Tax
EBITDA	Earnings Before Interest, Taxes, Depreciation, and Amortization
EDM	*Electricidade de Moçambique, E.P.* (Electricity Company of Mozambique)
EGENCO	Electricity Generation Company Malawi (Ltd)
EIRR	Economic Internal Rate of Return
EPC	Engineering, Procurement and Construction
ESCOM	Electricity Supply Corporation of Malawi, Ltd.
ESIA	Environmental and Social Impact Assessment
ESKOM	Electric Power Utility of Republic of South Africa
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESSP	Energy Sector Support Project
EU	European Union
FCF	Free Cash Flow
FM	Financial Management
FMR	Financial Monitoring Reports
FSP	Financial Strengthening Plan
FUNAE	*Fundo de Energia* (Energy Fund)
FY	Fiscal Year
GBV	Gender-based Violence
GDP	Gross Domestic Product
GIAF	*Gestão Integrada de Administração e Finanças* (Integrated Financial Management System)
GoMA	Government of Malawi
GoMO	Government of Mozambique
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
HCB	*Hidroeléctrica de Cahora Bassa* (Cahora Bassa Hydropower Plant)
HVDC	High Voltage Direct Current
ICR	Interest Coverage Ratio

IFC	International Finance Corporation
IFR	Interim Financial Report
IPF	Investment Project Financing
IPP	Independent Power Producer
IRP	Integrated Resource Plan
IRR	Internal Rate of Return
JPCC	Joint Project Coordination Committee
JPSC	Joint Project Steering Committee
KfW	*Kreditanstalt fur Wiederaufbau* (German Reconstruction Credit Institute)
M&E	Monitoring and Evaluation
MCC	Millennium Challenge Corporation
MERA	Malawi Energy Regulatory Authority
MGDS	Malawi Growth and Development Strategy
MIGA	Multilateral Investment Guarantee Agency
MIREME	Ministry of Mineral Resources and Energy
MIS	Management Information System
MOTRACO	Mozambique Transmission Company
MoU	Memorandum of Understanding
MWK	Malawian Kwacha
MZN	New Mozambican Metical
NES	National Electrification Strategy
NLDC	National Load Dispatch Center
NPV	Net Present Value
NTF	Norwegian Trust Fund
O&M	Operations and Maintenance
OPEX	Operating Expenditure
PAP	Project-affected Person
PDO	Project Development Objective
PERIP	Power Efficiency and Reliability Improvement Project
PIM	Project Implementation Manual
PIU	Project Implementation Unit
PPA	Power Purchase Agreement
PPSD	Project Procurement Strategy for Development
RAP	Resettlement Action Plan
ROA	Return on Assets
ROCE	Return on Capital Employed
ROE	Return on Equity
ROI	Return on Investment
ROIC	Return on Invested Capital
ROW	Right of Way
RPF	Resettlement Policy Framework
SADC	Southern African Development Community
SAPP	Southern African Power Pool
SCADA	Supervisory Control and Data Acquisition
SCMS	Substation Control and Monitoring System
SDG	Sustainable Development Goal

SEA	Sexual Exploitation and Abuse
STE	*Sociedade Naçional de Transporte de Energia* (National Enterprise for Electricity Transmission
T&D	Transmission and Distribution
TA	Technical Assistance
TREP	Temane Regional Electricity Project
TTP	Temane Transmission Project
WACC	Weighted Average Cost of Capital
WAPP	West African Power Pool
ZESCO	Zambia Electricity Supply Company Limited

TABLE OF CONTENTS

DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Malawi, Mozambique	Mozambique - Malawi Regional Interconnector Project	
Project ID	Financing Instrument	Environmental Assessment Category
P164354	Investment Project Financing	A-Full Assessment

Financing & Implementation Modalities

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

Expected Approval Date	Expected Closing Date
17-Sep-2019	31-Dec-2022

Bank/IFC Collaboration

No

Proposed Development Objective(s)

The project development objective is to interconnect Malawi and Mozambique's transmission systems to enable them to engage in bilateral and regional power trade in the Southern African Power Pool.

Components

Component Name	Cost (US$, millions)
Component 1: Mozambique-Malawi power transmission infrastructure	127.00
Component 2: Technical Assistance and Capacity Building	3.00

Organizations

Borrower:	Ministry of Finance, Economic Planning and Development Ministerio da Economia e Financas
Implementing Agency:	Electricidade de Mocambique, E.P. Electricity Supply Corporation of Malawi, Ltd.

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	130.00
Total Financing	130.00
of which IBRD/IDA	57.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Development Association (IDA)	57.00
IDA Credit	15.00
IDA Grant	42.00

Non-World Bank Group Financing

Counterpart Funding	7.00
Borrower/Recipient	7.00
Trust Funds	24.00
Free-standing Cofinancing Trust Fund	24.00

Other Sources	42.00
EC: European Commission	20.00
GERMANY, Govt. of (Except for BMZ)	22.00

IDA Resources (in US$, Millions)

	Credit Amount	Grant Amount	Guarantee Amount	Total Amount
Malawi	15.00	0.00	0.00	15.00
National PBA	5.00	0.00	0.00	5.00
Regional	10.00	0.00	0.00	10.00
Mozambique	0.00	42.00	0.00	42.00
National PBA	0.00	14.00	0.00	14.00
Regional	0.00	28.00	0.00	28.00
Total	**15.00**	**42.00**	**0.00**	**57.00**

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2020	2021	2022	2023
Annual	6.00	20.00	25.00	6.00
Cumulative	6.00	26.00	51.00	57.00

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	Yes

country gaps identified through SCD and CPF	
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	Substantial
3. Sector Strategies and Policies	Moderate
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Substantial
7. Environment and Social	High
8. Stakeholders	Substantial
9. Other	
10. Overall	Substantial

COMPLIANCE

Policy

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

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	✓	

Performance Standards for Private Sector Activities OP/BP 4.03		✓
Natural Habitats OP/BP 4.04	✓	
Forests OP/BP 4.36	✓	
Pest Management OP 4.09		✓
Physical Cultural Resources OP/BP 4.11	✓	
Indigenous Peoples OP/BP 4.10		✓
Involuntary Resettlement OP/BP 4.12	✓	
Safety of Dams OP/BP 4.37		✓
Projects on International Waterways OP/BP 7.50		✓
Projects in Disputed Areas OP/BP 7.60		✓

Legal Covenants

Sections and Description
ESCOM to maintain a ratio of total operating revenues to total operating expenses of not less than 1.0.

Sections and Description
Current ratio: ESCOM to maintain a ratio of current assets to current liabilities of not less than 1.0.

Sections and Description
Debt service coverage ratio: ESCOM to ensure that the estimated free cash flows from its operating activities shall be at least 1.0 times the estimated maximum debt service requirements for any such Fiscal Year on all its debt.

Sections and Description
The Project Implementing Entity shall maintain a financial management system and prepare financial statements in accordance with consistently applied accounting standards acceptable to the Association, both in a manner adequate to reflect the operations and financial condition of the Project Implementing Entity, including the operations, resources and expenditures related to its Respective Part of the Project.

Sections and Description
The Project Implementing Entity shall have its financial statements referred to above audited by independent auditors acceptable to the Association, in accordance with consistently applied auditing standards acceptable to the Association. Each audit of these financial statements shall cover the period of one fiscal year of the Project Implementing Entity. The Project Implementing Entity shall ensure that the audited financial statements for each period shall be:(a) furnished to the Recipient and the Association not later than six months after the end of the period; and (b) made publicly available in a timely fashion and in a manner acceptable to the Association.

Sections and Description
The Project Implementing Entity shall monitor and evaluate the progress of its Respective Part of the Project and prepare Project Reports for its Respective Part of the Project in accordance with the provisions of Section 5.08 (c) of the General Conditions and on the basis of Indicators acceptable to the Association.

Sections and Description
The Project Implementing Entity shall provide to the Recipient not later than four (4) months after the Closing Date, for incorporation in the report referred to in Section 5.08 (c) of the General Conditions all such information as the Recipient or the Association shall reasonably request for the purposes of such Section.

Sections and Description
The project implementing entities (ESCOM and EDM) shall, within thirty (30) days after the Effective Date of the Financing Agreements, establish and maintain throughout Project implementation a Project Implementation Unit with resources and composed of key staff, with qualifications, experience and under terms of reference acceptable to the Association.

Conditions

Type	Description
Effectiveness	The project implementing entities (ESCOM and EDM) shall have adopted the joint Project Implementation Manual, as referred to in Section I.B of Schedule 2 to the Financing Agreements and Grant Agreement, in form and substance satisfactory to the Association..
Effectiveness	The Subsidiary Agreements, as referred to in Section I.C of Schedule 2 to the Financing Agreements and Grant Agreement, shall have been executed between the Recipients and the Project Implementing Entities in form and substance satisfactory to the Association.
Effectiveness	The KfW-Mozambique Co-financing Agreement has been executed and delivered and all conditions precedent to its effectiveness or to the right of the Recipient to make withdrawals under it (other than the effectiveness of the Mozambique Financing Agreement) have been fulfilled.
Effectiveness	The KfW-Malawi Co-financing Agreement has been executed and delivered and all conditions precedent to its effectiveness or to the right of the Recipient to make withdrawals under it (other than the effectiveness of the Malawi Financing Agreement) have been fulfilled.
Effectiveness	The IDA-Mozambique Financing Agreement, the KfW-Mozambique Financing Agreement and the NTF-Mozambique Grant Agreement have been executed and delivered and all conditions precedent to their effectiveness or to the right of the Republic of Mozambique to make withdrawals under them (other than the effectiveness of the Malawi Financing Agreement)

	have been fulfilled.
Type Effectiveness	Description The IDA-Malawi Financing Agreement and the KfW-Malawi Financing Agreement have been executed and delivered and all conditions precedent to their effectiveness or to the right of the Republic of Malawi to make withdrawals under them (other than the effectiveness of the Mozambique Financing Agreement) have been fulfilled.
Type Effectiveness	Description The NTF-Mozambique Grant Agreement has been executed and delivered and all conditions precedent to its effectiveness or to the right of the Recipient to make withdrawals under it (other than the effectiveness of the Mozambique Financing Agreement) have been fulfilled.

I. STRATEGIC CONTEXT

1. The proposed project is integral to the efforts of the Southern African Power Pool (SAPP) to debottleneck and expand the regional network; create conditions to expand access to millions of people in the region living without electricity; and decarbonize the Southern Africa power systems, which are currently dominated by coal generation. The proposed project will extend and interconnect the transmission networks in Mozambique and Malawi, and enable power trade between the two national utilities, Electricity Company of Mozambique (*Electricidade de Moçambique,* EDM) and Electricity Supply Corporation of Malawi, Ltd. (ESCOM). This project will fund Malawi's first interconnection to the SAPP, which has been a priority for the SAPP since the early 2000s with several attempts to translate to reality. The much-awaited political commitment to trade power was showcased in April 2019 with the signing of commercial agreements between the two countries.

2. The project responds to Mozambique's sectoral priorities to emerge as a regional energy hub. By exporting power to Malawi, it increases future potential for exporting electricity through the SAPP. Exports provide additional revenues in the form of hard currency, which may be used to develop the domestic electricity sector. This transmission corridor will open up domestic and regional access to the solar, hydropower and gas resources located in the north of Mozambique that require economies of scale to be developed. The project will also improve the viability of the domestic electricity market by enhancing revenue flows to EDM which has faced a deteriorating financial condition in recent years.

3. The project acts to address Malawi's sectoral challenges. First, it addresses electricity supply deficits and ensures security of supply as well as reliability and affordability of electricity through imports from Mozambique and, in the future, other SAPP members. It also reduces the potential for a power crisis based on droughts affecting the Shire River. The project will enable Malawi to diversify its energy sources through connection into Matambo - a major substation in the SAPP system, which collects a substantial part of current and future power generated in Mozambique (and is thus a vital node in the SAPP regional network). Second, it addresses the need for back-up in the form of diversified external sources of power, especially to enable some redundancy in the Malawi power system and allow for outages and refurbishment of existing Malawian generation plants. Third, it would reduce the need for some backbone transmission investment within Malawi for transporting power from regions abundant in power generation resources to those characterized by scarcity of resources. Finally, the line could become a source of revenue for Malawi to trade power in the SAPP, once the new domestic power generation sources are available for example, the Mpatamanga Hydropower Project.

A. Regional Context

4. **Southern Africa is a large and diverse region with significant growth potential and major development needs**. The Southern Africa region covers a vast geographical area of about 9 million km^2 comparable to that of the United States or China and is home to over 340 million people, with total gross domestic product (GDP) of about US$690 billion. The 16 countries in the region are members of the Southern African Development Community (SADC), established in 1992 to promote socio-economic integration as well as political and security cooperation.[1] The geographic and developmental diversity is notable: four members are island countries; six are landlocked; seven have populations below 10 million people; and some are dominated by deserts and are water-scarce, while others rely on transnational river basins for their water resources. The region has several middle-income countries - Angola, Botswana, Namibia, Mauritius, Seychelles, Eswatini (former Swaziland), and South Africa had a per capita GDP in excess of US$3,000 in 2017 but also includes some of the poorest, with the Democratic Republic of Congo (DRC), Madagascar, Malawi and Mozambique having GDP per capita below US$500 (2017). South Africa has by far the largest economy (GDP of US$349 billion in 2017) and is the

1 The SADC member countries are Angola, Botswana, Comoros, the Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Eswatini, United Republic of Tanzania, Zambia, and Zimbabwe (https://www.sadc.int).

economic engine of the region. A number of the lower income countries, such as DRC, Mozambique, Tanzania, Zambia, and Zimbabwe have diverse resources and significant potential to drive the growth and economic diversification of the region.

5. **The region has ample and diverse natural resources to meet the growing energy demand in a sustainable manner, with regional integration playing a key role in enabling the countries to benefit from this abundance and diversity**. The current energy mix in the power sectors of the region, especially in its southern part, is dominated by coal, mainly because of the use of coal in South Africa, whose current generation capacity of about 54,000 MW is 72 percent coal based (however in fiscal year (FY) 18, 91 percent of electricity generated by the Electric Power Utility of Republic of South Africa (ESKOM) was from coal power plants[2]). South Africa and Botswana have significant coal reserves, Namibia has natural gas, the DRC has globally leading levels of hydropower, Zambia has hydropower, and Mozambique has large potential for hydropower and coal as well as globally significant quantities of natural gas. The regional energy developments are faced with the twin challenges of (a) increasing generation capacity in support of economic growth while (b) reducing its carbon intensity at lower cost. Due to the geographic location and diversity of the resources, regional integration is a key instrument to optimize the energy mix of the countries through trade and energy balance.

6. **Recognizing the importance of regional energy integration, in 1995, the SADC created the SAPP.**[3] Energy has been identified as one of the SADC's key thematic areas for regional development action. The SAPP's main objectives are to promote cooperation in regional electricity planning and operation, facilitate regional trading, increase access to electricity in rural areas, and ensure attractive investment environment through competitive tariffs. Currently there are 16 members in the SAPP.[4] The main grid systems of Botswana, the DRC, Lesotho, Mozambique, Namibia, South Africa, Eswatini, Zambia, and Zimbabwe form the existing regional network. Crucially, Malawi, as well as Angola and Tanzania[5], are not yet connected and are therefore not able to benefit from regional trade.

7. **The SAPP is a growing, diverse market with large and evolving investment needs in national and regional energy infrastructure**. Average access to electricity in the SAPP region was only 37 percent in 2016 (27 percent excluding South Africa), with the level of access quite uneven across countries. South Africa is the only member where it exceeds 90 percent, and only in three other countries does it exceed half of the population: Botswana (61 percent), Namibia (52 percent) and Eswatini (66 percent). In the remaining countries, it ranges between 11.0 percent (in Malawi) and 40.5 percent (in Angola). Electrification programs are a developmental priority in all the countries, with a shared objective of achieving universal electrification by 2030, consistent with the United Nations Sustainable Development Goals (SDGs). Achieving this objective will require large investments across the electricity (and energy) supply chain, including in national and regional electricity infrastructure.[6] Even though off-grid electrification solutions and decentralized

[2] ESKOM Integrated Report, March 31, 2018, page 140.

[3] The SAPP covers 12 non-island SADC member countries: Angola, Botswana, the Democratic Republic of Congo, Lesotho, Malawi, Mozambique, Namibia, South Africa, Tanzania, Zambia, Zimbabwe, and Eswatini. Angola, Malawi, and Tanzania are yet to be connected to the integrated SAPP market. Tanzania is being connected through the AFR RI-3A Tanzania-Zambia Transmission Interconnector (P163752), financed by the World Bank regional project.

[4] Botswana Power Corporation, Copperbelt Energy Cooperation, EDM, ESCOM, ESKOM, *Hidroelectrica de Cahora Bassa* (HCB), Lesotho Electricity Corporation, Lunsemfwa Hydro Power Company, Mozambique Transmission Company (MOTRACO), NamPower, *Rede Nacional de Transporte de Electricidade*, *Societe Nationale d'Electricite*, Eswatini Electricity Company, Tanzania Electricity Supply Company, Zambia Electricity Supply Company Limited (ZESCO), Zimbabwe Electricity Supply Authority.

[5] The three countries not connected are expected to be connected in the following sequence: (a) Tanzania – 2022; (b) Malawi – 2022; and (c) Angola – 2025.

[6] To illustrate the scale of the challenge, assuming 2.6 percent population growth (consistent with the recent trends), the population of the SAPP region could reach about 440 million in 2030. If 90 percent of the population were to have access to electricity by then, it would mean providing access to 280 million people or more than 60 million connections (assuming household size of 4.5) between 2017 and 2030, on average about 4.3 million connections annually. In FY2016/17, the utilities had in total about 12.4 million customers, about half of them

generation are gaining prominence, especially with the advancements in solar and battery technologies, the grid infrastructure will still need significant developments in all the SAPP countries to enable electrification and reliable and secure supply to the developing industrial and urban centers.

8. **The SAPP is the first and the most advanced power pool on the continent**[7] **providing an alternative for bilateral energy trade.** The SAPP has developed functioning multilateral competitive markets (intra-day, day-ahead, weekly, and monthly forward physical markets), the only power pool in Africa to do so. It has established a coordination center in Harare (Zimbabwe), which monitors the operation of the power pool and adherence to the operating rules, advises on feasibility of wheeling arrangements for bilateral trade, and operates the competitive markets. Greater payment discipline has been seen through the market than bilateral contracts, but bilateral contracts will continue to be sought by the countries. Although the SAPP market trade is rapidly increasing, it only represents 11 percent of the total trade in the region. Bilateral trade still represents 89 percent of the total trade. From the countries' perspective, having access to both options, regional market and bilateral contracts, diversifies and reduces the dependency risks. Transmission limitations impose significant constraints on competitive trade, about two-thirds of the matched bilateral trade could not be executed because of transmission challenges.

B. Country Context

Mozambique

9. **Mozambique is a low-income country in Southeast Africa with a GDP per capita of US$417 and a population of about 30 million.** It is well positioned for global trade, with four of the six neighboring countries being landlocked and is bordered by the Indian Ocean to the east. The country is endowed with ample arable land, water, energy, and mineral resources and newly discovered natural gas offshore. The economy is strongly influenced by the agricultural sector that accounts for 22 percent of Mozambique's GDP but employs about 71 percent of the population.[8] Close to 94 percent of the poor are engaged in agriculture and most of them are rural residents.[9] The extractives sector has been a driver of the recent improvement in GDP growth, maintaining double-digit output growth in 2016. This trend continued in early 2017 with a 41 percent expansion in output, mostly driven by mineral exports.

10. **Mozambique's macroeconomic stability has been compromised by an untenable debt situation, resulting in a very tight fiscal context**. After registering 7 percent of GDP growth on average since 2011, Mozambique's economic performance experienced a sharp downturn in 2016, triggered by falling commodity prices, adverse climate conditions, and the discovery of US$1.4 billion in previously undisclosed public debt (equal to about 10 percent of GDP). The Government of Mozambique (GoMO) responded to the economic slowdown and debt accumulation with a revised budget, restructured spending program, and overtures to creditors to begin restructuring talks. This was accompanied by a tight fiscal regime, with both credit and investment levels continuing at a low level.

11. **The pace of poverty reduction in Mozambique is accelerating but with significant spatial variation**. Poverty has been on a declining trend accompanied by progress on related development indicators such as health and education. Current estimates using the international poverty line of US$1.90 per day indicate that 68.7 percent of the population is classified as being poor in 2017. According to the Human Capital Index, Mozambique reached 0.361 points in 2017, which was lower than the average for its region and income group and ranks at 148 out of 157 countries. In addition, the

ESKOM's.

[7] Sub-Saharan Africa has three other power pools, listed here in the decreasing order of their institutional development and physical integration: West African Power Pool (WAPP); East African Power Pool (EAPP); and Central African Power Pool (CAPP).

[8] World Bank. (2018). Mozambique Economic Update. October 2018.

[9] World Bank. (2018). Strong but not Broadly Shared Growth – Mozambique Poverty Report

distribution of poverty is uneven across the country, with rural provinces in the center and the north accounting for a disproportionate share of the poor (about 70 percent).

12. **Mozambique's five-year Government Plan (2015–2019) highlights agricultural and industrial development as the basis for socioeconomic development of the country**. The five-year Government Plan presents five strategic pillars to achieve accelerated economic growth and social development and targets expanded infrastructure as a key element to enhance the productive sectors of the economy, increase economic diversification, and improve access to markets. This calls for expanding access to electricity services to all Mozambicans by 2030 to support the young and growing population with productive opportunities.

Malawi

13. **Malawi is located in South east Africa with a population of about 18 million people[10].** The population growth rate is estimated at 2.8 percent per year and is expected to reach 23 million by 2025. Malawi remains a rural economy, however, the country is urbanizing relatively quickly at an annual rate of around 3.5 percent, higher than the average for Sub-Saharan Africa.

14. **The economy is largely agrarian, and poverty remains widespread**. Agriculture contributes about 30 percent of GDP, over 80 percent of the total export earnings, and 85 percent of employment. The prevalence of low-productivity rain-fed agriculture constrains poverty reduction. Macroeconomic instability over the years and the predominantly agricultural economic structure, have contributed to the slow pace of poverty reduction. The current estimates using the international poverty line of US$1.90 per day indicate that 69.4 percent of the population was classified as being poor in 2017.[11] Malawi is ranked 171 out of 189 countries on the United Nations Human Development Index[12].

15. **Medium-term economic prospects appear positive as the country recovers from two years of weather-induced shocks.** The agriculture sector is heavily dependent on rainfall. In recent years, climate variability has led to a recurrence of floods and droughts in various parts of Malawi. Real GDP growth, after two consecutive years of drought, fell below 3 percent in 2016 but picked up to 4 percent in 2017. Inflation dropped from 9.9 percent in March 2018 to 9.3 percent by March 2019.[13] The Government of Malawi (GoMA) launched the medium-term strategy (third Malawi Growth and Development Strategy ([MGDS] III [2017 – 2022]), looking beyond the recent crisis, to establish strong foundations for economic recovery and growth. The MGDS III has five main pillars: (a) Agriculture and Climate Change Management; (b) Education and Skills Development; (c) Transport and Information and Communication Technology Infrastructure; (d) Energy, Industry and Tourism Development; and (e) Health and Population Management. Economic patterns show signs of positive structural change, with the share of agricultural employment falling and that of more productive sectors like industry and services increasing.

[10] 2018 Malawi Population and Housing Census - Preliminary Report (December 2018)
[11] World Bank (2017). Malawi Economic Monitor – Realizing Social Protection's Potential, Macroeconomics, Trade and Investment Global Practice, Washington, DC: The World Bank.
[12] United Nations Development Programme – Human Development Indices and Indicators: 2018 Statistical Update.
[13] Consumer Price Indices (March 2019): The GoMA National Statistical Office.

C. Sectoral and Institutional Context

Table 1. Key Parameters in Mozambique and Malawi Power Sectors

Parameter	Mozambique	Malawi
Electricity Access rate	31 percent overall with 52percent in the urban areas and 4 percent in rural areas.	11 percent overall with 42 percent in the urban areas and 4 percent in rural areas[14].
Number of electricity customers	1,890,555	423,455[15]
Installed capacity	2,580 MW of which 911 MW is available for domestic consumption	496 MW
Energy mix	56 percent hydropower, 42 percent gas, and 2% imported	75 percent hydropower, 25 percent thermal
Share of private sector in generation (%)	12[16]	16
Average cost of service	US$0.12/kWh	US$0.18/kWh
Average tariff	US$0.11/kWh	US$0.12/kWh
Average transmission and distribution losses (%)	29	17.8
Electricity bill collection rate (%)	97	93

Note: a. Malawi Integrated Household Survey 2016 – 2017 (November 2017).
b. ESCOM customer data as of December 2018.

Mozambique Power Sector

16. **The current institutional structure of the power sector derives from the 1997 Electricity Law.** The Ministry of Mineral Resources and Energy (MIREME) is responsible for energy policy and planning, as well as monitoring sector performance and governance. EDM, is the state-owned, vertically integrated utility with operations in generation, transmission, and distribution countrywide. HCB is the largest power generation company, in charge of operating the 2,075 MW Cahora Bassa power plant and the associated transmission system; the generation sector is complemented by independent power producers (IPPs) that have signed power purchase agreements (PPAs) with EDM. In May 2017, the Parliament approved the creation of *Autoridade Reguladora de Energia* in an effort to separate the regulatory and policy functions in MIREME. The new regulatory body has been given the authority among others, to regulate the electricity tariff, promote and monitor competition in the power sector, and monitor and enforce the terms and conditions of the licenses or concession contracts in the power sector. The Energy Fund (*Fundo de Energia*, FUNAE) is a public body subordinated to MIREME with the aim of promoting the development and use of different forms of low-cost energy and the sustainable management of energy resources. Initially setup as a fund, FUNAE today mostly implements off-grid access projects. In addition to the Electricity Law, private investments in the electricity sector are also governed by the Public-Private Partnership Law (2011).

17. The Mozambican power sector has been developed with a two-fold objective to meet domestic electricity demand through EDM and develop the export market as an anchor demand to exploit the large indigenous energy resources.

[14] Malawi Integrated Household Survey 2016-2017 (November 2017) and official sources.
[15] ESCOM customer data as at December 2018
[16] This is in comparison to the total generation capacity in Mozambique. Private generation accounts for approximately 40percent of domestic consumption.

Both these strategic objectives have competing needs because of the large investment requirements. In October 2018, the GoMO approved: (a) the National Electrification Strategy (NES) focused on universal access to electricity services by 2030 and (b) the Power System Integrated Master Plan 2018 – 2042. Both these policy documents describe the development of the power sector in the least-cost manner and outline the investments planned in the short, medium, and long-term.

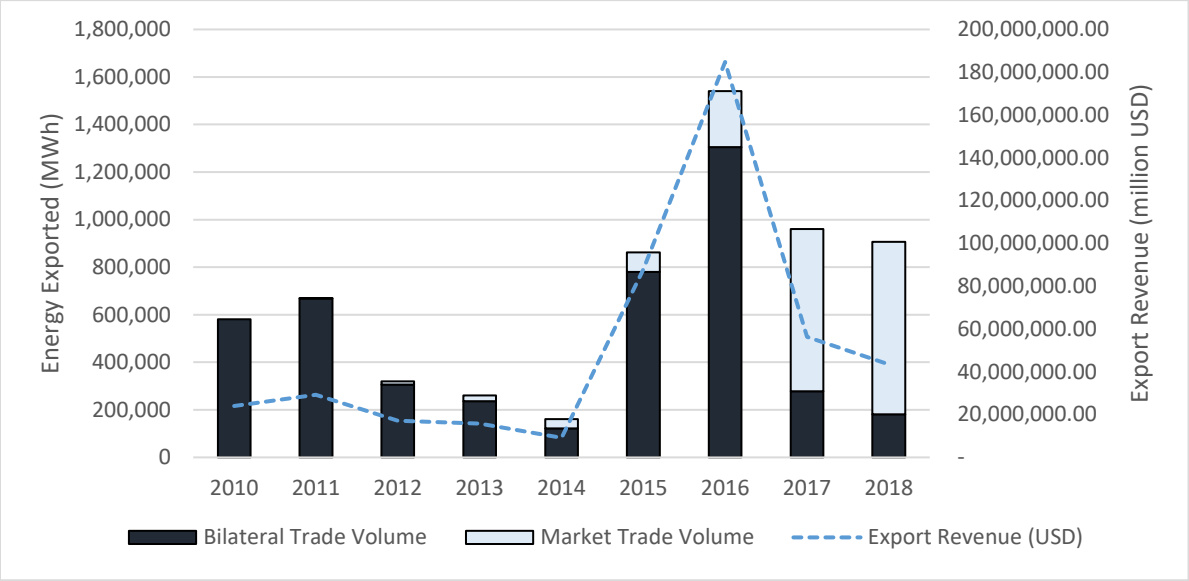
18. **Mozambique is rich in conventional and renewable energy sources and has emerged as a regional energy hub**. Mozambique has 7.5 GW of renewable energy potential, including 5.6 GW of hydro, 1.1 GW of wind and 0.6 GW of solar.[17] The country has significant experience with gas through the Pande/Temane fields. Furthermore, gas reserves in the Rovuma Basin, offshore in northern Mozambique, are sufficiently large to be used simultaneously for exports, major industry and power generation. Mozambique also has world class reserves of coal. Part of these reserves have sufficient quality to be exported, while a significant portion can be used for domestic power generation. Mozambique's vast energy resources far exceed those needed to satisfy domestic demand (historically growing at 10 percent annually), including access expansion; the country is also well positioned to engage in significant regional trade. The country is well interconnected with South Africa, the country's largest purchaser of electricity mostly from the Cahora Bassa hydropower plant (1,330 MW of HCB's total capacity is committed to ESKOM, South Africa, under a long-term PPA, that ends in 2029) and with other neighboring countries, with opportunities for onward trade with the wider region forming the SAPP. Mozambique, through EDM, currently trades electricity with six countries:[18] South Africa, Zimbabwe, Eswatini, Zambia, Botswana and Lesotho. In the past it also traded with Namibia. Currently, Mozambique's installed capacity largely consists of hydro (84 percent) and thermal (16 percent), accounting for a substantial contribution of base-load renewable energy.

19. **The Mozambican power system is integrated with the SAPP mainly through its connections with the South African network (and Eswatini), complemented by interconnections with Zimbabwe**. The regional integration strategy also includes the construction of two additional high-voltage transmission lines from Tete to the Maputo region, under the *Sociedade Nacional de Transporte de Energia* (STE) project. Each STE line is about 1,400 km long, one being a direct current 500 kV line for bulk transmission of electricity from the Zambezi hydropower plant to the SAPP network, and the other line being an alternating current 400 kV line that would add more offtake points in Mozambique and would thus serve both the domestic and export markets. The STE lines and associated generation plants are to be developed in phases. Phase 1 includes the construction of a 400 MW gas-based power plant at Temane, to be developed as an IPP project (*Central Térmica de Temane* [CTT]) and a 560 km high-voltage (400 kV) transmission line from Temane to Maputo (Temane Transmission Project or TTP). TTP is part of the STE alternating current line, to be developed as a publicly funded project with EDM as its main sponsor. This integrated CTT project/TTP is being supported by IDA under the proposed Temane Regional Electricity Project (TREP) (P160427). The TREP aims to provide the additional generation that would enable Mozambique to trade power with Malawi.

20. **Mozambique is already taking advantage of its surplus energy availability and existing interconnectors to trade in the regional power pool.** Energy exports are generally increasing with a greater share being given to the regional market. The large increase in bilateral trade in 2015 and 2016 was because of a regional drought which placed the region in a supply deficit. The diverse sources of energy (particularly gas) are not prone to seasonal or climate variations, which enables the country to sustain its levels of power production even when the neighboring countries, which are hydro dominant, are affected by droughts. An increasing share of power traded in the market is noted in the most recent years indicating a higher level of confidence in the market.

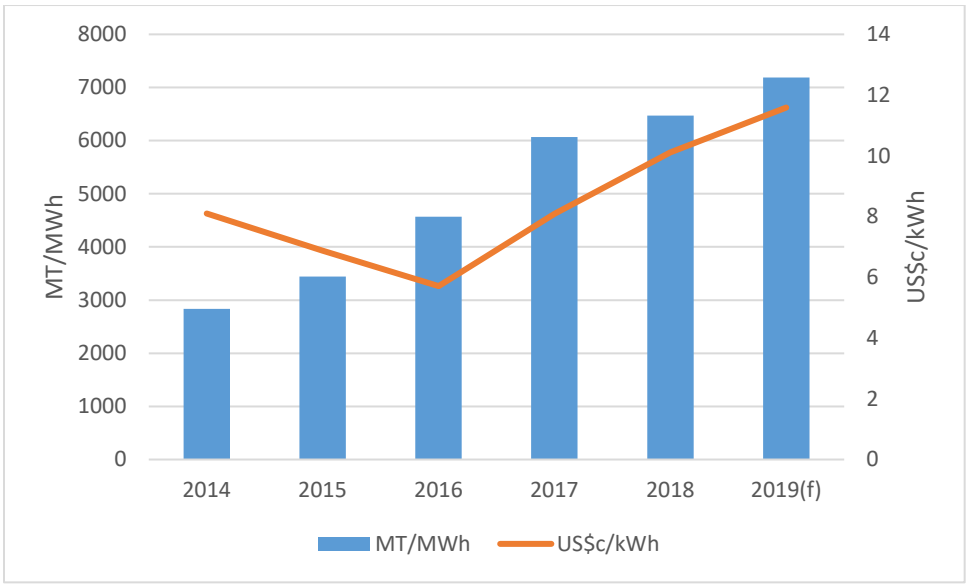
[17] Renewable Energy Atlas of Mozambique, 1st Edition 2014.
[18] This excludes cross-border trade with Malawi and Tanzania, which supply electricity to Mozambique's villages near the border posts.

Figure 1: EDM Regional Trade Volumes and Revenue



Source: EDM Data 2018.

Figure 2: EDM Average Domestic Tariff Evolution



Source: EDM Data 2019.

21. **EDM is experiencing a fragile financial situation.** This is due to a combination of: (a) a deteriorating macroeconomic situation increasing EDM's exposure to foreign currency liabilities in 2015–2016[19]; (b) retail tariffs not

[19] With the depreciation of the Metical, Mozambique's national currency, EDM's average sale price (in U.S. dollar) declined from US$0.0845 per kWh in 2011 to US$0.0629 per kWh in 2016, whereas its average domestic supply costs (in U.S. dollar) increased from US$0.0846 per kWh in 2011 to US$0.0955 per kWh in 2016. This divergence in electricity costs and sales price, caused by the macroeconomic situation, led EDM to experience significant net losses.

recovering the cost of power purchases and operations; (c) capital expenditures for rehabilitation of the network and increasing energy access not adequately funded; (d) adverse conditions in the regional power market (decrease in export prices); (e) limited supply from HCB because of hydrological constraints; and (f) high electricity losses estimated at 27 percent (in 2017). Despite several tariff adjustments, EDM has been accumulating operational losses on an accrual basis and significant payable arrears on a cash basis. EDM's financial position also worsened because of the accumulation of receivables arrears, particularly from electricity exports to Zambia Electricity Supply Company Limited (ZESCO).[20] Despite a partial debt restructuring process and a more regular electricity supply from HCB in 2018, EDM remains exposed to several exogenous factors and its financial position remains tight. To address this situation, the Government has been implementing a Financial Strengthening Plan (FSP) which includes (a) a performance contract of EDM through the implementation of PERIP's[21] Component 2 to reduce system losses from 29 percent in 2018 down to 19 percent in 2024; (b) a recapitalization process of EDM in line with the recommendations of the cost of service study (50 percent recapitalization); (c) capital expenditure (CAPEX) for electricity access projects financed according to the NES; and (d) electricity tariffs adjusted in line with domestic inflation and full pass-through of generation costs.

22. **The Government's commitment to achieve universal access to electricity by 2030 has elevated the importance of domestic demand.** In October 2018, the President launched the NES to be implemented through *Programa Nacional de Energia para Todos* (National Electricity Program for All), representing a renewed momentum towards Mozambique's achieving of universal electricity access by 2030. The strategy envisages ramping up the annual electricity connections to 350,000 by 2020 and to 590,000 on average between 2025 and 2030 to achieve universal access, with an estimated overall investment of US$6.5 billion.

23. **The proposed project responds to Mozambique's aspirations to develop an investment strategy for the power sector that aligns domestic and regional priorities.** The strategy involves fundamental strengthening of the country's transmission system by construction of a country-wide 400 kV transmission backbone that would: (a) integrate the country's disjointed subsystems; (b) provide domestic and regional markets with access to the country's large-scale hydropower, gas-to-electricity sites and renewable generation in the north; and (c) facilitate large-scale electrification of the country and contribute to the electrification of the region in a carbon-reducing manner. The west-east transmission backbone will start in Tete (Mozambique's north-west), crossing into Malawi and interconnecting with Malawi's grid at Phombeya. A future second phase will run through Malawi crossing back into north-east Mozambique and ending in Nacala. Once completed, the corridor will connect the resource-rich Tete Province in Mozambique to the fastest growing electricity demand center in Mozambique. This corridor will open up domestic and regional access to the solar, hydropower and gas resources located in the north of Mozambique that require economies of scale to be developed.

Malawi Power Sector

24. **In 2017, Malawi experienced sector unbundling with separation of ESCOM's generation assets and functions into the Electricity Generation Company, Malawi (EGENCO).** Until August 2016, the power system in Malawi was vertically integrated with the national power utility, ESCOM, being responsible for generation, transmission and distribution (T&D) of electricity. The objectives of these unbundling reforms were to allow for private investment in the sector, particularly in the generation segment; improve the performance of ESCOM; and strengthen the regulatory framework. These reforms were supported by the Millennium Challenge Corporation (MCC) Compact of the United States Government and World Bank. Malawi has an energy regulator Malawi Energy Regulatory Authority (MERA), since 2004.

[20] Throughout 2016, ZESCO, accumulated arrears to of US$60 million to EDM. Repayment of these arrears is under negotiation between the two utilities.

[21] Power Efficiency and Reliability Improvement Project (P158249), financed by the World Bank.

25. **Malawi is experiencing severe power supply constraints further exacerbated by lack of connection to the SAPP**. As of December 2018, the country had a total installed generation capacity of 496 MW, of which 75 percent is from hydropower resources along the Shire River. The country's demand is estimated to be around 440 MW, leading to a supply deficit because of the low availability of hydropower especially during the dry season. The hydropower sources are exposed to hydrologic variability, and in the past two years, severe droughts have led to reduced water levels in Lake Malawi and consequently, reduced flow in the Shire River. This had led to prolonged load shedding of up to 12 - 16 hours a day during several months of the year, but according to ESCOM, the situation has abated somewhat with the introduction of new diesel generation leading to average load shedding being reduced to 6 hours a day from 2018 onwards. About 108 MW of emergency diesel generation capacity has been installed to immediately assist with the supply deficit, although at a high cost of about US$0.42 per kWh.

26. **The Government is addressing these power supply challenges through an Integrated Resource Plan (IRP)** that was funded under the World Bank Energy Sector Support Project (ESSP – P099626). The IRP lays out the least-cost generation and transmission expansion plan for the country for 2017 - 2037. The Mozambique-Malawi Regional Interconnector project is selected as a priority investment and least-cost option in all the scenarios examined under the IRP with its earliest commissioning in 2021. Other least-cost options include the development of the Mpatamanga hydro power plant (308 MW), the Kamwamba coal plant (300 MW), and solar generation. The Government has recently concluded the awarding of solar IPP projects for a total generation capacity of 216 MW (as of May 2019), and an unsolicited IPP for a 40 MW hydro power plant.

27. **The weak financial position of ESCOM hampers its ability to undertake investments and ensure reliable service delivery**. The average electricity tariff is insufficient to meet ESCOM's cash flow requirements. Because of its financial situation, the utility has no borrowing capacity, and the Government has been assuming debt for meeting ESCOM's CAPEX needs. As a result of its financial position, ESCOM (a) has not been able to perform regular operation and maintenance (O&M), which has led to poor customer service including service interruptions and increased restoration time, and (b) has focused on only connecting high-value customers who were able to afford the connection charge. Minor improvements in the tariff regime have been made over time. ESCOM submitted an application to MERA to request a 60 percent increase in tariffs for the next four-year period (2018 to 2021) against which 31.8 percent was approved for the same duration, of which 20 percent was made effective in 2018/19. The average tariff for 2018/19 is MWK 88.02 (about US$0.12) and will increase to MWK 95.15 (about US$0.13) in 2021/22.

28. **The GoMA aims to rapidly scale up electricity access to reach about 80 percent of the population by 2035, and it is developing a National Electrification Program.** In 2018, the GoMA updated the National Energy Policy of 2003 to define the national energy development agenda in relation to the Malawi Vision 2020, MGDS III, and the SDGs. The overall goal of the National Energy Policy 2018 is to establish a guiding framework, including policy and strategic direction, for achieving increased access to affordable, reliable, sustainable, efficient, and modern energy for every person in the country. It emphasizes the importance of establishing the institutional and regulatory framework to support the achievement of energy access goals. According to the National Energy Policy 2018, the GoMA currently aspires to reach 80 percent electricity connectivity by 2035.[22]

[22] 35 percent in Tiers 4 and 5 and 45 percent in Tiers 1, 2, and 3 as per the SE4All definitions of service level tiers.

D. Relevance to Higher Level Objectives

29. **The proposed project is consistent with the World Bank Group's Country Partnership Framework (CPF) for Mozambique for FY17 - FY21.**[23] One of the objectives of the CPF is to help expand access and improve reliability of electricity supply, in support of promoting diversified growth and enhanced economic productivity. This project, along with operations to help Mozambique with grid expansion, grid rehabilitation, and reinforcement, and with strengthening of the financial and operational functioning of EDM, will support the above-mentioned objectives. The CPF acknowledges the need for investments in expanding domestic and regional transmission networks to facilitate expanded power trade in the Southern Africa Region and boost EDM's revenues, ambitious electrification goals, and Mozambique's hard currency earnings through electricity exports.

30. **The proposed project is consistent with the Malawi FY13-16 Country Assistance Strategy (CAS)[24], which is in turn fully aligned with the Government´s MGDS II, adopted in April 2012, and the subsequent Economic Recovery Plan launched in October 2012.** The CAS responds to the economic and governance context in Malawi and prioritizes the World Bank Group's support around three themes: (a) Promoting Sustainable, Diversified, and Inclusive Growth; (b) Enhancing Human Capital and Reducing Vulnerabilities; and (c) Mainstreaming Governance for Enhanced Development Effectiveness. High among the focus areas in the CAS are efforts to enhance economic productivity through investments in infrastructure, notably with improved energy supply. Malawi's energy sector needs substantial investments to eliminate energy shortages, by upgrading T&D systems to reduce energy losses and by establishing transmission interconnections to the SAPP to enhance availability and diversity of energy supply. The Government launched the third Malawi Growth and Development Strategy (MGDS III 2017 – 2022) which is the five-year medium-term implementation plan of Malawi's Vision 2020, to establish strong foundations for economic recovery and growth. The project is fully aligned with the goal of pillar 3 of MGDS III relating to Energy i.e. to provide sufficient, sustainable energy for industrial and socio-economic development.

31. **The proposed project contributes to achieving the strategic priority goals in the electricity sector,[25] set out in the SADC Regional Infrastructure Strategic Development Master Plan,[26]** including (a) adequate generation and transmission capacity; (b) improved energy access; and (c) harmonized cross-border policy and regulatory frameworks.

32. **The proposed project is consistent with the World Bank Group's approach to Maximizing Finance for Development.** The project is part of a comprehensive World Bank engagement in the energy sector providing support across the value chain throughout the Southern African region. In Mozambique and Malawi, the World Bank Group is leveraging synergies between IDA, International Finance Corporation (IFC), and Multilateral Investment Guarantee Agency (MIGA) to improve electricity service delivery by providing coordinated technical and financial support to attract private capital on commercially viable projects in the generation sector. Furthermore, the World Bank is supporting countries in the region with technical assistance (TA)—such as in the TREP (P160427) in Mozambique—to explore the

[23] International Development Association, International Finance Corporation, and Multilateral Investment Guarantee Agency: Country Partnership Framework for the Republic of Mozambique for the Period FY17–FY21, Report No. 104733-MZ March 30, 2017.
[24] Malawi FY13 – 16 CAS. Report Number 74159-MW. The CAS was extended by a PLR through end FY17. The World Bank Group's new CPF for Malawi will cover FY 20-24. The CPF is expected to focus on growth and resilience, human development, and institutions for implementation. It will support the MGDS III (2017–2022), which has five priority areas: (a) agriculture and climate change; (b) education and skills development; (c) energy, industry, and tourism development; (d) transport and information and communication technology infrastructure; and (e) health and population.
[25] http://www.africa-platform.org/sites/default/files/resources/eac_vision_2050_february_2016.pdf.
[26]http://www.sadc.int/files/5413/5293/3528/Regional_Infrastructure_Development_Master_Plan_Energy_Sector_Plan.pdf.

possibility of introducing public-private partnerships to finance transmission lines, where the appetite from the private sector is currently low because of perceived sectoral risks.

33. **The project supports the World Bank's regional integration and partnerships approach for Africa**. By supporting regional infrastructure connectivity through power exports, the proposed project can achieve economies of scale which would be difficult to achieve at a national level, lowering costs to the end user, improving supply reliability and offering more environmentally friendly generation. The project is in line with the World Bank's Africa Strategy's[27] two pillars: the first pillar which promotes competitiveness, including through support to infrastructure development and attracting private sector investments, and the second pillar that aims to reduce vulnerability and increase resilience to macroeconomic (for example high oil prices) and climate variability shocks (for example dependence on hydropower), as well as its foundation that emphasizes improving governance and public sector capacity.

II. PROJECT DESCRIPTION

34. The proposed project aims to establish a transmission link between Malawi, and Mozambique to meet increasing electricity demand in Malawi and create opportunities for trading in the SAPP. The 218 km, 400 kV high voltage alternating current transmission line will start at Matambo in Tete Province in central Mozambique and will cross the Malawian border into Mwanza and end at Phombeya in Balaka District in southern Malawi. The substation works required in Mozambique and Malawi are also included in the project.

35. This project has historically received high priority at a political level by the SADC. A similar project was prepared before by the World Bank (with a different technical configuration) and approved by the Board in 2007. However, because of lack of technical and political buy-in and commercial disagreements between the two countries, the project did not move forward (P084404, Mozambique-Malawi Transmission Interconnection Project}.[28] The proposed credit for the GoMA was then cancelled, while the credit for the GoMO was restructured. Lessons learned from the past project are discussed in Section II.F.

A. Project Development Objective

PDO Statement

36. The Project Development Objective (PDO) is to interconnect Malawi and Mozambique's transmission systems to enable them to engage in bilateral and regional power trade in the Southern African Power Pool.

PDO Level Indicators

37. The indicators that will be used to measure achievement of the PDO are:
(a) Wheeling capacity enabled by the project (MW); and
(b) Increased annual electricity traded between ESCOM and EDM (MWh)

[27] https://www.worldbank.org/en/region/afr
[28] http://documents.worldbank.org/curated/en/141431491945390535/pdf/MZ-TUP-P084404-March-20-clean-pm-ICR00003952-04052017.pdf

B. Project Components

38. The proposed project will consist of two components: (a) Mozambique - Malawi Power Transmission Infrastructure dedicated to the construction of the transmission line and associated infrastructure; and (b) Technical Assistance and Capacity Building for the Project Implementation Units (PIUs) and technical staff of the participating countries for effective management and operation of the transmission infrastructure.

Component 1: Mozambique-Malawi Power Transmission Infrastructure (US$127 million equivalent, of which IDA grant is US$41 million, and IDA credit is US$13 million)

39. This component will have two sub-components informed by a transmission line design, and implemented with the support of a supervision consultant funded under this component:

Sub-component 1-A: Construction of the Transmission Interconnector and Associated Substation in Mozambique (US$91.5 million, of which IDA grant is US$41.0 million, KfW grant is US$22 million equivalent, NTF is US$24 million, and GoMO contribution is US$3.5 million)

40. On the Mozambique side, this would include construction of approximately 142 km of a 400 kV transmission line, with second phase to be strung by 2025[29] including a 1.7 km river crossing across the Zambezi River in Tete, the extension of the existing Matambo 220 kV substation, and construction of a new 220/400 kV, 500 MVA substation also at Matambo including the installation of a control monitoring system. It will also include installation of 220 kV transmission line connection between the new 220/400 kV 500MVA substation at Matambo and the existing Matambo 220 kV substation. In addition to the proposed IDA grant, this sub-component will be co-financed with a World Bank-administered grant from the Norwegian Trust Fund (NTF) and a grant from the Government of Germany to be administered by the German Reconstruction Credit Institute (*Kreditanstalt fur Wiederaufbau*, KfW).

Sub-component 1-B: Construction of the Transmission Interconnector and Associated Substations in Malawi (US$35.5 million, of which IDA credit is US$13.0 million, KfW grant is US$20 million equivalent, and GoMA contribution is US$2.5 million)

41. On the Malawi side, this would include construction of approximately 76 km of a 400 kV transmission line with second phase to be strung by 2025, and extension of the existing Phombeya Substation including the installation of a control and monitoring system. In addition to the IDA credit, this sub-component will be co-financed with a grant from the European Union (EU) to be administered by KfW.

Component 2: Technical Assistance and Capacity Building (US$3 million equivalent, of which IDA credit of US$2 million and IDA grant of US$1 million)

42. This component will also have two sub-components.

Sub-component 2-A: Technical assistance and Capacity Building in Mozambique (US$1 million IDA grant)

43. This sub-component will support EDM PIU in project management, including safeguards supervision, mitigation of gender-based violence (GBV) risks, and implementation of a gender action plan. It will also support transmission network and system operations related training. The work under this TA will complement capacity building activities in other World Bank projects under implementation in Mozambique, including the TREP (P160427).

[29] Provided that demand growth projections materialize as estimated.

Sub-component 2-B: Technical assistance and Capacity Building in Malawi (US$2 million IDA credit)

44. This sub-component will support the ESCOM PIU in project management, including safeguards supervision, mitigation of GBV risks, and implementation of a gender action plan. It will also support market development studies to identify scope and contractual arrangements for the additional capacity on the line and future options within the current and proposed regulatory framework for public-private participation in regional transmission projects. The work under this TA will complement capacity-building activities in other World Bank projects under implementation in Malawi, including the Malawi Electricity Access Project (P099626).

Project Cost and Financing

45. The proposed funding is through an Investment Project Financing (IPF) in the amount of US$130 million. The amount of US$57.0 million equivalent will be from IDA resources as a combination of an IDA grant and an IDA credit. For Mozambique, this will be complemented by grant financing from the Government of Norway administered by the World Bank through the NTF in the amount of US$24.0 million, and a grant from the German Government administered by KfW in the amount of US$22 million equivalent. For Malawi, this will be complemented by a grant from the EU administered by KfW in the amount of US$20 million equivalent. Contributions from the host governments will be US$7 million. The implementation of Resettlement Action Plans (RAPs), according to the Resettlement Policy Frameworks (RPFs) is also considered in the project cost, which will be funded by the Governments of Mozambique and Malawi. EDM and ESCOM will be responsible for paying these costs directly to the project affected persons (PAPs) and recording these transfers in a manner acceptable to the World Bank, in accordance with the approved RAP. The two utilities will make their contributions for the project available from their annual budgets.

46. The NTF has supported the preparation of the proposed project with financing for feasibility studies, environmental and social impact assessments, RPF, preparation of the RAP, operational costs, and capacity building to the value of US$3.6 million. The activities financed are considered part of the project and the total value is allocated in Component 1 of the proposed project.

Table 2. Estimated Project Cost and Financing (US$, millions)

Project Components	Project Cost	IDA	KfW	Norway	EDM/ GoMO	ESCOM/ GoMA
Component 1: Mozambique-Malawi Power Transmission Infrastructure	**127.0**	**54.0**	**42.0**	**24.0**	**4.5**	**2.5**
A - Mozambique	**91.5**	41.0[*a]	22.0[*a]	24.0[a]*	4.5	-
B - Malawi	**35.5**	13.0[b]**	20.0[a]*	-	-	2.5
Component 2: Technical Assistance and Capacity Building	**3.0**	**3.0**			-	-
A - Support to EDM (Mozambique)	**1.0**	1.0[a]*			-	-
B - Support to ESCOM (Malawi)	**2.0**	2.0[b]**			-	-
Total	**130.0**	**57.0**	**42.0**	**24.0**	**4.5**	**2.5**

Note: Infrastructure project components include 10 percent of price and physical contingency.
*[*a] Grant*
*[**b] Credit*

47. The Mozambique-Malawi Regional Interconnector Project and implementation support components will be co-

financed in the form of a grant from the Norway's Support to the Regional Power Infrastructure Projects in Southern Africa Single-Donor Trust Fund (the NTF), which has been established and has supported the preparation of the project. It is expected that grant resources, in an indicative total amount of about US$30 million for the recipient-executed portion, will be secured and be available for joint co-financing. The grant agreement will be signed based on the contributions received into the NTF.[30] Additional grant resources will then be passed on to the GoMO as and when they are received without the need to process a restructuring or additional financing. In case the co-financing does not materialize or is less than expected, either additional resources will be sought potentially through an IDA additional financing mechanism; or the financing gap will be funded by the GoMO.

C. Project Beneficiaries

48. The main project beneficiaries are the consumers of additional electricity provided by ESCOM and EDM in domestic and regional markets.

49. In the case of Malawi, with the construction of new transmission lines and grid connection of ESCOM's transmission grid to the SAPP, households, businesses and farmers in Malawi will have more reliable access to electricity, vital to improve productivity and competitiveness in the domestic and regional markets. Financial benefits will also accrue to ESCOM from a reduction in operating costs because of improved infrastructure, less reliance on emergency diesel plants and ability to engage in regional power trade.

50. In the case of Mozambique, EDM will benefit from the additional hard currency revenues generated from exported power and wheeling, which could contribute directly to finance electrification efforts. According to the NES, the Electrification Account will be partially funded from taxes on electricity exports.[31] Additionally, an improved financial situation at EDM, as a result of export revenues, would lead to improved services and new connections, implicitly benefitting both the existing and new electricity consumers in Mozambique.

51. The SAPP will benefit from the additional transmission line which will enable increased regional power trade. The increased trade volumes will also increase the SAPP's revenues through trade commissions. Introducing ESCOM as an operating member will improve the SAPP's inclusive regional pool.

52. ESCOM and EDM will also benefit from capacity strengthening and TA to carry out their respective mandates to implement regional power trade. Considering the bi-directionality of the line, ESCOM will also benefit from additional revenues from exported power by trading on the SAPP and creating bilateral contracts once its supply situation is favorable.

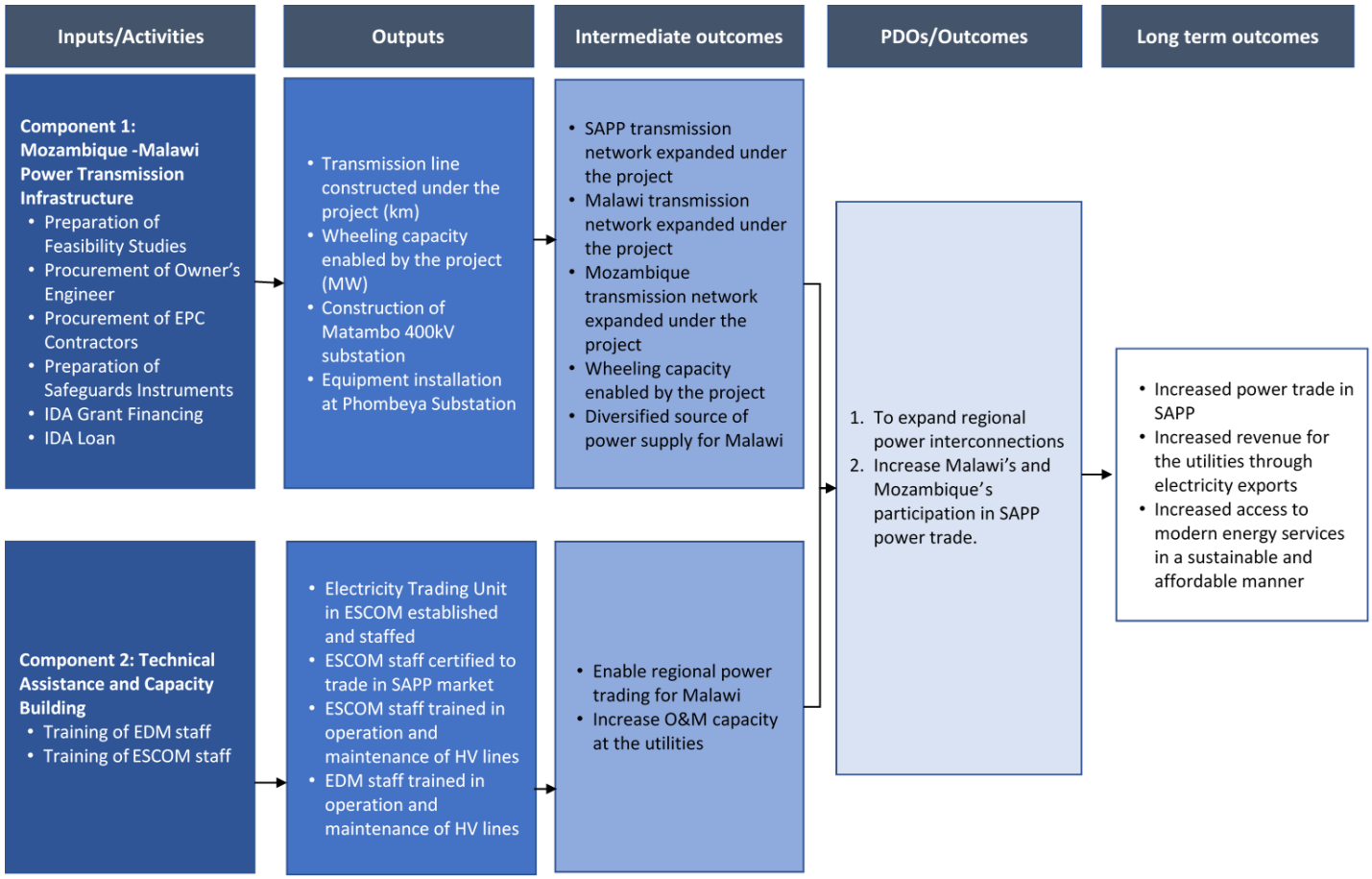
[30] The NTF supports the preparation and implementation of the Mozambique-Malawi Interconnection Project (P164354/TF018537), and TREP (P160427/TF097013). In addition to the US$24 million to be provided under this project, a total of US$5 million has previously been made available to support project preparation activities and early implementation, and another US$500,000 was used to cover administration fees.

[31] The funding is to be provided by contributions from the GoMO's budget, generation concessions fees, taxes on electricity exports, concessional financing from development partners, and contribution from existing electricity consumers through an electrification levy.

D. Results Chain

53. Figure 3 below provides a visual depiction of the theory of change behind the operation, explaining the causal link between activities, outputs, short-term outcomes, medium-term outcomes, and longer-term outcomes also identified as 'aimed scenario' expected to occur beyond project closure. The proposed project's theory of change is built on the basis of the current regional scenario (2019), which outlines the main challenges, and then explains how the project plans to address them to achieve its objectives.

Figure 3. Project Results Chain



Note: EPC – Engineering, procurement and construction.

E. Rationale for World Bank Involvement and Role of Partners

54. **The rationale for public financing.** The long-term economic and environmental benefits are substantial for Mozambique and Malawi. This project is aligned with the World Bank's efforts to support the development of Mozambique's and Malawi's power sectors and strengthening of their integration into the regional power market under the SAPP (see table 3).

Table 3: Project Pipeline to Use IDA Resources

	Name	Current Status	Preparation Funding Source	Countries
1	Luapula Hydro Power Project	Pre-feasibility	IDA/KfW/DBSA[32]	DRC and Zambia
2	Mozambique-Zambia Interconnector	Feasibility	AfDB[33]/USTDA[34]/IDA	Mozambique and Zambia
3	Mozambique-Malawi Interconnector	Commercial agreements signed in April 2019. Expected IDA financing approval in Q1, FY20	IDA/Norway	Malawi and Mozambique
4	Zambia-Tanzania-Kenya Interconnector	Final design studies ongoing. Financing approved for Tanzanian portion; Zambian portion is expected to be delivered in FY20	IDA/EU	Tanzania and Zambia
5	TREP	IDA financing approved in Q4, FY19	IDA/AfDB/Norway/ Private sector	Mozambique
6	Malawi-Zambia Interconnector	Feasibility study completed for Malawi section under IDA funded ESSP. Additional feasibility study for the Zambia section of the Line being undertaken.	IDA. GoMA, Govt. of Zambia	Malawi and Zambia

55. The project will expand and interconnect the physical infrastructure to allow both countries to trade power. The project's economic viability is predicated on imports into Malawi from Mozambique during the initial years and limited off-peak exports from Malawi to Mozambique and the SAPP in the future.

56. The prevalence of private sector participation in transmission has been negligible so far both in terms of domestic and regional lines in Sub-Saharan Africa, but efforts are under way in a handful of countries to pilot such models. Further, there is limited appetite in the private sector to invest in this kind of a regional interconnector project given the absence of enabling regulation in Malawi, the financial condition of the two utilities and the level of political engagement required. The ability of ESCOM and EDM to assume debt to fund project capital expenditures on commercial borrowing terms especially with limited borrowing capacity requires them to source donor funding.

57. **The value added of World Bank support.** The World Bank is a key development partner providing comprehensive support to the GoMO and the GoMA in its efforts to advance development of the power sector. The World Bank has a number of ongoing and recently closed operations in the power sector in Mozambique and Malawi, covering the entire value chain.

58. The proposed project builds upon long-term experience and continued engagement of the World Bank in supporting capacity building and construction of physical infrastructure in the regional markets. The World Bank has been providing financing for regional infrastructure in the WAPP countries. In the SAPP region, the World Bank is funding investment planning and preparation of selected priority regional energy projects.[35] The World Bank is financing the

[32] DBSA = Development Bank of South Africa.
[33] AfDB = African Development Bank.
[34] USTDA = United States Trade and Development Agency.
[35] International Development Association: Project Appraisal Document on a Proposed Grant in the Amount of SDR 13.2 million (US$20 million equivalent) to the Southern African Power Pool for a Southern African Power Pool (SAPP)–Program for Accelerating Transformational Energy Projects, October 21, 2014, Report No. 86076-AFR.

Tanzania-Zambia Transmission Interconnector, which would connect the EAPP and the SAPP, with TA and capacity building for the EAPP, creating what could be the largest geographically interconnected region in the world.

59. The World Bank programs in Mozambique and Malawi complement the programs of IFC and MIGA to collectively maximize finance for development. The World Bank Group has pursued an overall program in the power sector that combines the resources and instruments of each organization to mobilize the private sector capital and maximize finance for development.

60. The IFC has been strongly engaged in the energy sector in Mozambique over the last five years. In June 2017, IFC signed two power plant transactions: the refinancing of the 175 MW Ressano Garcia thermal power plant (*Central Térmica de Ressano Garcia* - CTRG) gas-fired plant sponsored by Sasol and EDM and the 40 MW Mocuba photovoltaic solar plant sponsored by Scatec, Norfund, and EDM. To help consolidate this success and build much needed capacity, IFC, with financing from the Government of Norway, is providing TA of about US$2 million to EDM, financing an embedded adviser who is assisting EDM in strengthening its treasury and risk management functions. MIGA also supports the power sector in Mozambique with approximately US$89.1 million of gross exposure in the sector, covering the Gigawatt IPP project.. In Malawi, the IFC has recently signed a joint development agreement with the GoMA for the Mpatamanga hydropower plant, which will position the institution as an equity partner in the project.

61. **Role of partners.** The proposed project will have two co-financing development partners, IDA and KfW, providing implementation support to the implementing units from EDM and ESCOM. IDA will finance both components of the project, while KfW will provide co-financing in the amount of US$42 million (through an EU grant to Malawi, and Government of Germany grant for Mozambique) for Component 1, to be disbursed as construction progresses, in proportion to the overall contribution for the component. In addition to financing, IDA and KfW will provide technical, fiduciary, and safeguards implementation support to the utilities.

F. Lessons Learned and Reflected in the Project Design

62. The considerations applied to the earlier version of the proposed project remain relevant, the design of the project has also benefitted from lessons learned from other regional power network interconnector projects financed by the World Bank.[36]

- **Strong political and commercial will to be established at the outset**. Efforts were made to develop institutional and commercial arrangements that enable buy-in at all levels. The project's mutual benefits were discussed and agreed by the two implementing utilities. The project has also been discussed at presidential level, between the two countries, showing the change of sentiment and commitment towards the project from the GoMA. The commercial agreements for 50 MW of power trade were signed between the two utilities, EDM and ESCOM, on April 11, 2019. ESCOM is also in discussion with ESKOM South Africa for sourcing an additional 150 MW from ESKOM under a separate PPA. Beyond these amounts, ESCOM is planning to source power from the day-ahead market in the SAPP, the levels of which will be an outcome of demand, and available supply.

- **Mutually agreed and transparent terms of electricity trading should be established as a prerequisite for the**

[36] These projects include the Central Asia South Asia Electricity Transmission and Trade Project (CASA-1000), (P145054); OMVG Interconnection Project (P146830); the WAPP - Côte d'Ivoire, Liberia, Sierra Leone, and Guinea Power System Re-development (P113266); Ethiopia/Nile Basin Initiative: The Ethiopia-Sudan Interconnector (P074011); and the Energy Sector Management Assistance Program Regional Power Sector Integration Lessons from Global Case Studies and a Literature Review, 2010.

implementation of a dedicated transmission interconnector. Development of dedicated transmission interconnectors such as the Mozambique-Malawi Interconnector (in the absence of further connections between Malawi and other countries) requires that the primary beneficiary country (Malawi) and the primary supplier of electricity agree on a fair, transparent, and firm PPA to ensure the long-term availability of supply at predictable prices. This is critical for ensuring that both parties can agree on the rules of the game and be able to estimate the total cost of delivered power (and the cost effectiveness of the interconnector alternative for the country buying the power) along with the revenue resulting from the project for the seller.

- **The project design should maximize opportunities for mutually beneficial trade.** A strong value proposition for both countries improves the buy-in for both sides, allowing negotiations on the terms of electricity trading to take place on a more equal footing. Greater balance in the accrual of benefits, increases the likelihood of being able to reach a mutually agreed upon cost-sharing/pricing arrangement. In the previous project, with the failure to sign the Power PPA, the benefits were uncertain. The expected benefits from the sale of power during off-peak periods by Malawi to Mozambique, and the extension of the line onward into northern Mozambique, were too uncertain to tangibly impact the negotiations. A more balanced accrual of benefits changed the negotiating positions and allowed a mutually agreeable sharing of costs to be reached. The mutual benefits of the project were thoroughly analyzed during appraisal. The World Bank ensured that the merits of the project were explained to both parties and that a future extension of the line was fully considered.

- **Technical designs should be based on long-term load development outlook.** Many interconnections have been built to meet short-term demand and have quickly become congested, resulting in the need for expensive expansion in the future that can also pose difficult right-of-way (ROW) and other challenges. The Mozambique-Malawi Interconnector capacity (400 kV phased double circuit) is designed with a view for long-term domestic development in Malawi and Mozambique and growing power trade among the SAPP countries. Excess capacity is built into the transmission line design to allow for growth in supply volumes along the line through increased domestic electricity generation.

- **Advance preparation of key technical studies, safeguards assessments, and major procurement packages can significantly speed up implementation.** The advance preparation of the interconnector feasibility study was a key input for the project's successful and timely technical design and its subsequent modifications. The preparation and timely disclosure of the Environmental and Social Impact Assessments (ESIAs) were critical in identifying areas in need of further attention or reassuring all stakeholders of the limited scope of the project's environmental and social impact. Advanced readiness of major bidding packages for the project could help jump-start early progress of procurement activities under any project. The team has adopted this approach for the proposed project. Significant preparation work was done to define the technical and commercial aspects of the project before approval.

- **Ensure clarity in co-financing arrangement.** Another lesson relates to the simplification of project implementation, involving multiple financiers, by clarifying the applicable guidelines, processes, and timing well in advance. In the proposed project, IDA and KfW have agreed to co-finance the project through a proportional contribution arrangement, where all disbursements under Component 1 of the project will be shared in proportion to the total contribution of each donor in the component.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

63. **Implementing institutions.** ESCOM and EDM will be responsible for the implementation of the Malawi and Mozambique portions of the project respectively. To manage the coordination and address any issues that arise because of the regional nature of the project, a three-level structure has been put in place and is fully operational:

- **A Joint Project Steering Committee (JSPC)**, comprising senior staff from the Ministry of Natural Resources, Energy and Mining; Ministry of Finance, Economic Planning and Development, and ESCOM in Malawi, and MIREME, Ministry of Economy and Finance and EDM in Mozambique, will provide oversight to address any inter-governmental or inter-utility issues that need to be resolved at the Government level. Such discussions at the ministerial level may be facilitated by the two Country Management Units as needed.
- **A Joint Project Coordination Committee (JPCC)**, comprising of the Department of Energy Affairs, Malawi; Department of Energy, Mozambique, and senior management from the two utilities, reports to the JPSC. The committee is responsible for high-level project coordination and for referring any critical issues to the JPSC. The JPCC will submit an overall quarterly and annual project progress report to the JPSC. The report will describe the status of implementation of the Procurement Plans, physical progress, and financial reports. The JPCC will be supported by a project coordinator consultant to consolidate information from both utilities.
- **ESCOM and EDM each have a PIU**. For the two utilities, the PIUs include at least a project manager, a project engineer, a social and environmental specialist, a procurement specialist, a financial management (FM) specialist, and technical specialists including transmission line and substation engineers and a staff member familiar with World Bank procurement guidelines. EDM and ESCOM have jointly procured a contract for the feasibility study of the project under a single contract, as well as contracts for ESIA and RPF studies. These contracts are paid by the World Bank-administered NTF. An Owner's Engineer also will be hired by ESCOM and EDM under a single contract. The ESCOM and EDM project managers, with input from the FM specialists from the respective PIUs will be responsible for financial reporting of the ESCOM and EDM parts respectively. Training and capacity building for the ESCOM and EDM PIUs will be included in the project. The Institutional implementation arrangements are further described in annex 2.

64. There are five key agreements governing the implementation and operation of the transmission interconnection. These agreements were agreed and signed on April 11, 2019. They are (a) the Project Implementation Agreement between EDM and ESCOM; (b) the Maintenance Agreement between ESCOM and EDM; (c) the System Operating Agreement between EDM, ESCOM, and HCB; (d) the Wheeling Agreement between EDM and ESCOM; and (e) the PPA between EDM and ESCOM. The Wheeling Agreement specifies a monthly payment rate from ESCOM to EDM, which will cover the investments for the Mozambique portion of the transmission line, irrespective of the amount of power transferred along the line.

65. The IDA contribution to the project will be in two forms (a) IDA Grant to the GoMO and (b) IDA Credit to the GoMA. The funds will be on-lent to the respective utilities. Both utilities have experience in implementing World Bank financing and EDM already operates a Designated Account (DA) for the preparation activities for this project, funded by the NTF.

66. For successful implementation of project aspects related to capacity building for regional integration and trade, the engagement and support from the SAPP experts and specialists from other operational power pools will be required. Twinning arrangements will potentially be set up with utilities that participate in power pools and implement short-term

trading.

B. Results Monitoring and Evaluation Arrangements

67. The monitoring and evaluation (M&E) of activities will be performed by EDM and ESCOM with the support of a jointly appointed Owner's Engineer. The Owner's Engineer shall include as part of its team, a joint project director who will be responsible for providing to the PIUs, the required quarterly implementation progress status reports and data for each country for the preparation of the country-specific Quarterly Progress Reports (QPRs) by the PIUs. Activities to be monitored by the Owner's Engineer include the timely and efficient construction and commissioning of the transmission line, quality control, as well as the effective implementation by the contractors and consultants of the Environmental and Social Management Plans (ESMPs) and the RAPs of the project.

68. Each PIU will be responsible for monitoring project progress, in its respective country. Each PIU shall be also responsible for preparing an M&E manual as part of a joint Project Implementation Manual (PIM), which will guide the M&E activities. Project-specific data will be collected by the PIUs from the Owner's Engineer and contractors. Each PIU will prepare a QPR. The same will be used by the Project Coordination Consultant in the Project Coordination Committee to prepare a consolidated QPR for submission to the JPCC, the JPSC, and to the World Bank. Section VI presents the project's results framework that defines specific outcomes and results to be monitored under this project. In addition, the World Bank will carry out the regular implementation support missions, and request financial monitoring reports (FMRs), quarterly reports of EDM and ESCOM, independent annual financial audits of the project and financial statements of EDM and ESCOM. KfW and the World Bank have agreed on a single report format that will be used to monitor progress of project activities, as well as implementation of the ESMP and RAPs.

C. Sustainability

69. The sustainability of this project depends on several factors which have been considered in the project design:

(a) EDM and ESCOM's financial and technical capacity to operate and maintain project infrastructure, and effectively engage in regional power trade;

(b) Availability of surplus energy at a lower cost than domestic alternatives; and

(c) Opportunities for increased use of the transmission line in the medium term.

70. First, EDM and ESCOM's continued mandate to operate the T&D networks in their respective countries is a key factor for sustainability of the project. The two utilities have been maintaining and operating the electricity network and they are expected to continue to do so. Both utilities are in a difficult financial situation, which could be a constraint for sustainability of the assets; however, these issues are being addressed as part of the sector dialogue in the two countries. In-house development of technical capacity is critical to allow ESCOM to trade in the SAPP market, this is being supported by the United States Agency for International Development (USAID) through the Southern African Energy Program, which is supporting ESCOM in developing the trading capacity required to participate in the regional market. In addition to these aspects, the five key agreements governing implementation and operation of the transmission infrastructure under this proposed project, ensure sustainability of the assets throughout their useful life. The System Operating Agreement and Maintenance Agreement ensure that the O&M responsibilities are efficiently attributed, costs are recovered monthly and assets are adequately maintained.

71. Second, the current cost of electricity in Mozambique and the regional market is significantly lower than the cost of electricity in Malawi. This creates a strong incentive for Malawi to import electricity to meet its growing needs. In

addition, new generation is expected to be commissioned in Mozambique and the region, which will enable additional trade between Malawi and the SAPP member countries.

72. Third, the demand forecasts and IRP for Malawi indicate that in the medium term the country will need to import electricity to meet its growing demand that could imply increasing opportunities to trade through the interconnector.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

Technical Analysis

73. The rationale for the project is supported by the least-cost development plan prepared for both countries as well as the SAPP Master Plan. The IRP of Malawi identifies the interconnector as a priority investment to meet Malawi's growing electricity demand, while the Integrated Master Plan for Mozambique, highlights the benefits the project will have for Mozambique to be further interconnected to the SAPP regional network. From a power system planning perspective, this project's timing fits well with the needs of both countries.

74. The SAPP Pool Plan (2017) outlines the mutual benefit of the proposed interconnector. Mozambique, at the start of the plan period has a comfortable reserve margin (30 percent). This increases across the period as Mozambique increases its generating capacity (from the existing about 2,500 MW) faster than demand growth over the period. The initial reserve margin in Malawi is negative (-22 percent) and peak demand could be met through imports if the country was connected to the neighboring networks. Generation capacity expansion in Malawi could result in satisfactory levels of reserve margin from the mid-2020s. However, the capacity installed fails to meet peak demand over the period, suggesting an ongoing reliance on imports. The long-term export-import relationship between the two countries is evident and the proposed transmission infrastructure is the key element required to make this arrangement work.

75. A basic design for the transmission line and terminal substations was prepared under technical and economic consideration. A feasibility study was first prepared in 2003 and thereafter in 2009, which considered a 220 kV high voltage line configuration based on the demand projections at that time. This study was revised in 2017, primarily to address the new demand projections and re-route the line to minimize the impacts in the field. The design of the project considered different alternatives, to provide a cost-effective design that complies with the technical requirements of the project according to the applicable standards taking into consideration local conditions in Mozambique and Malawi.

76. The interconnector will be built as a new 400 kV transmission line between the new 400 kV Matambo Substation in Mozambique and the existing Phombeya Substation, in Malawi. Phombeya Substation needs to be extended to add line and reactor bays. The project includes a connection to the existing 220 kV Matambo Substation and its extension. The length of the new 400 kV transmission line is about 218 km, 142 km in Mozambique and 76 km in Malawi. The line crosses the Zambezi River. The overall crossing length is 2.7 km, including a 1.7 km long span.

77. The equipment proposed in the feasibility study is common to the region. The towers selected are self-supporting steel lattice towers, typically used in high voltage lines in Mozambique and the region, and these will be fitted with Tern conductors, again a standard conductor in the region. The use of standard equipment for the line allows both the utilities to easily source spare parts and simplifies O&M.

78. Different design alternatives considering single and double circuit line configurations were analyzed: (a) a 400 kV

single circuit line; (b) a 400 kV double circuit line;, (c) a 400 kV phased double circuit line with second phase to be strung by 2025; and (d) a 400 kV parallel single circuit line. The third alternative, a 400 kV phased double circuit line with second phase to be strung by 2025, has been decided considering n-1 redundancy because installation of the double circuit line allows power transfer in case of system failures due to for example, lightning strikes, whereas a single circuit line does not allow power transfer in case of system failure.

79. The interconnector will interconnect Malawi with the ring on the eastern side of the SAPP. The Matambo Substation will be connected with the future Mozambique STE regional backbone interconnection, which has dual lines, that would interconnect central and southern Mozambique and provide a high voltage direct current (HVDC) link to demand in the region. Matambo is also interconnected with the north-eastern coast of Mozambique (see Annex 6).

80. A control and monitoring system for each substation will be installed and integrated with the national control centers of Malawi and Mozambique.

81. ESCOM has conducted system studies to simulate the operation of the two power systems in a synchronous and safe operation. During this study, testing on generator, excitation, and governor systems were performed at the specific power station units according to the approved test plans. Further measurement and validated dynamic models for the existing ESCOM generation plants were developed (the models included details of the tests undertaken at the various power stations; the results obtained; and the derived models for the generator, excitation, and governor systems). The system studies recommended measures to be undertaken to ensure seamless integration of the two systems. One of these measures is the integration of reactive compensation at the substations, which has been integrated in the proposed project's technical design.

82. EDM and ESCOM will engage contractors for the detailed design, supply, and installation of the transmission line packages and substations. The contractor responsible for construction of the transmission line will be appointed jointly, through a single procurement process. However, the appointed company will sign two separate contracts with the utilities, corresponding to the portions of the line in their respective countries. The implementing agencies require technical support for the engineering design and tendering process, construction supervision, and TA during the defects' liability period. Therefore, a consultant is at final stage of selection for preparation of the bidding documents, and to provide technical and management support to the PIUs during the tender process. An Owner's Engineer will support EDM and ESCOM with project management, including the ESMPs, supervision, carry out construction supervision; and undertake post construction activities, including training for the client's staff.

Economic Analysis

83. Traditionally in Africa, transmission lines (both national and regional) are perceived as natural monopolies and financed by the public sector. That is the case for most of the regional interconnectors in the SAPP and other African power pools such as EAPP and WAPP. So far, private sector participation has been largely confined to the generation sub-sector, even though countries in the region are exploring public-private partnerships to finance transmission lines. The appetite from the private sector is still limited because of low perceived returns and high risks. Considering the urgency of this project to mitigate the negative economic effects of lost load in Malawi, public sector financing largely supported by concessional finance from the donor community is the only realistic option for financing the proposed project on a priority basis.

84. Structuring large energy projects to achieve financial closure and lead to successful operation requires a complex set of skills that are not easily available in most SAPP countries. The World Bank's participation during the early stages with coordination between the two countries (as a neutral party/honest broker) has been key for the project's

preparation to move forward in a timely manner. The World Bank has and will continue to provide the required TA to both utilities to ensure adequate implementation of the project based on the World Bank's expertise acquired from similar projects in the Africa region. Sustained capacity building within the utilities is a condition for reaching the performance targets established in the project.

85. The economic analysis of the project was developed following the standard cost-benefit analysis to determine the net economic benefit of the proposed project. The economic costs of the project were compared with benefits over the first 10 years of operation (2022 - 2031). The economic analysis shows that the proposed project is economically robust, given that power shortages in Malawi are acute and the cost of emergency rental power plants required to avoid them is expensive. Based on the analysis, the project yields an economic internal rate of return (EIRR) of 18.2 percent, excluding environmental benefits, and a baseline net present value (NPV) of US$77 million (at 6 percent discount rate - see Annex 5).

Financial Analysis

EDM

86. Financial sustainability of EDM is critical for the overall performance of the power sector. The domestic electricity market in Mozambique is dominated by EDM,[37] which is the single buyer/seller of electricity. Under the current trading arrangements, IPPs, including both state-owned HCB and privately-owned firms, cannot sell electricity directly to domestic end consumers. EDM is responsible for adequacy of electricity supply in the domestic market, dispatch, transmission network expansion, and O&M of the T&D networks (with the exception of MOTRACO's transmission system and transmission line that belong to HCB). Therefore, the financial viability of the power sector and sustainability of sector investments rest on EDM's financial health.

87. EDM's financial situation is weak because of a combination of external and internal factors. Since 2013, EDM has operated with a net loss despite cumulative tariff increase of 127 percent over 2015–2018. The financial losses were caused by the escalating fuel and energy purchase costs and worsening of operational inefficiencies, which have outpaced tariff increases. The operating losses, coupled with accumulation of significant receivables in 2016–2017 due to nonpayment by some bilateral trading partners and increased financing of electrification, have resulted in significant cash deficits and accumulation of payables. The payables to IPPs only, as of December 31, 2018, stood at US$450 million. EDM also has sizable debt, which stood at US$1.1 billion as of December 31, 2018. The combination of these factors burdens EDM's balance sheet and constrains its borrowing space.

88. The GoMO is implementing an FSP that comprehensively addresses EDM's financial viability. The FSP encompasses measures to improve the operational efficiency of EDM, increase revenues in a socially sustainable manner, strengthen EDM's balance sheet, and finance electrification in a financially sustainable manner. The implementation of the FSP should eliminate the cash deficits of the power sector from 2021 onward, allowing EDM to fully meet its recurrent payment obligations to suppliers, service debt, and gradually repay the accumulated arrears to IPPs. The key elements of the FSP include tariff adjustment, operational efficiency improvement, ensuring sustainable funding for electrification, and recapitalization of at least 50 percent of the GoMO onlent debt to EDM to strengthen EDM's balance sheet and improve its solvency and leverage ratios.

ESCOM

89. ESCOM's capacity to deliver quality services, deploy its investment program, and support power generation strengthening in Malawi depends on the company's ability to maintain its financial condition and generate positive cash

[37] The EDM market does not include Mozal, which has special supply arrangements with ESKOM of South Africa, through MOTRACO.

flow streams. ESCOM needs to generate sufficient cash flows to meet its operating and capital requirements. This is critically related to two factors: (a) the level of power retail tariffs, which are reviewed and approved by MERA every four years and (b) cost efficiency and working capital management improvements. Power tariffs in Malawi are currently not cost reflective, even after a 31.8 percent cumulative increase recently approved by MERA over a four-year period, from October 1, 2018 to September 30, 2022.

90. ESCOM's financial assessment reflects the information contained in the company's audited financial statements for 2014 - 2017, the unaudited financial information for 2018 as provided by ESCOM in March 2019 and the financial projections for 2019 – 2029.[38]

91. At the end of 2018, ESCOM reported a net loss of MKW 19,674 million[39], following a profit of MKW 5,451 million in 2017, mostly because of the effects of the functional unbundling from the generation company EGENCO, which implied an increase in ESCOM's cost of purchased energy, together with its high operating expenditures (OPEX). Despite the net loss in 2018, during the prior two years (2016 and 2017), ESCOM had made increasing efforts and substantial progress in cleaning up its balance sheet. At the end of 2018, the utility was almost debt free, with only three long-term credits on its balance sheet. However, during 2018, ESCOM struggled to manage its working capital with trade payables having almost tripled. ESCOM also reported a minor decline in free cash flow (FCF) generation, and its liquidity ratios declined sharply in 2018 when compared to previous years with a negative return on capital invested.

92. A financial projection of ESCOM for 2019 to 2029, based on assumptions related to sales growth through new connections (20 percent annual average growth rate supported by new generation), improved efficiency, reduction in short-term high interest loans, and improved collection performance is expected to yield higher net revenues at a 26 percent compound average rate through 2026. ESCOM's profitability is expected to improve significantly during the projection years as are its key financial ratios. In particular, the interest coverage ratio (ICR) is projected to remain at high levels, because of the long grace periods, and relatively low interest rates applied to ESCOM's outstanding debt. Quick and current ratios are expected to remain well above the 1x threshold for the next few years, suggesting that ESCOM would be in a good position to repay its short-term obligations.

93. ESCOM's capital structure is expected to remain strong through the end of the projection period, with the net financial debt to total equity ratio declining in line with the reduction of long-term borrowings and increasing cash position. The debt service coverage ratio (DSCR) is expected to be above 1.2x through the end of the projection period due to a combination of a reduction in total debt repayment levels, and a healthy increase in earnings before interest, taxes, depreciation, and amortization (EBITDA), resulting from additional power supply, and increase in power tariffs. In particular, total interest charges and capital share to be repaid on an annual basis are not expected to rise above MKW 8 – 10 billion per year, compared to an EBITDA that is projected to be over MKW 145 billion in 2029 from around MKW 12 billion in 2019.

B. Fiduciary

(i) Financial Management

94. An FM assessment was conducted in accordance with the Directives and Policy for IPF and the World Bank Guidance on FM in World Bank IPF Operations issued on February 28, 2017. Its objective was to determine whether EDM

[38] ESCOM's fiscal year ends on June 30.

[39] According to the draft audited financial statements for 2018, ESCOM's net loss was MKW 12,963 million.

and ESCOM have acceptable and adequate FM arrangements to (a) ensure that funds are used only for their intended purposes in an efficient and economical manner while implementing agreed activities; (b) enable the preparation of accurate and timely financial reports; (c) ensure that funds are properly managed and flow smoothly, rapidly, adequately, regularly, and predictably; (d) enable project management to monitor the efficient implementation of the project; and (e) safeguard the project's assets and resources.

95. Implementation of the FM arrangements will be anchored under the oversight of the directors of finance of EDM and ESCOM, respectively. The accounting for the expenditures and their reporting will fall within the remit of the project FM specialists and the project funds, expenditures, and resources will be accounted for using the existing automated accounting software.

96. The overall residual FM risk rating of the project is Substantial. EDM and ESCOM will need to implement mitigating measures for the identified risks, including updating the World Bank-related procedures of the already existing FM Procedures Manual (part of the PIM), and register the project and its components in the Enterprise Resource Planning for EDM and the ESCOM management information system (MIS). The project financial statements will be audited annually by a private audit firm acceptable to the World Bank. For EDM, this audit will be done in accordance with International Standards on Auditing as issued by the International Auditing and Assurance Standards Board and for ESCOM the audit will be done in accordance with the International Financial Reporting Standards. The audit report and Management Letter will be submitted to the World Bank within six months after the financial year-end. The proposed FM arrangements, as summarized in annex 3, meet the requirements for FM under the Directives and Policy for IPF, and therefore, can provide, with reasonable assurance, accurate and timely information on the status of the project as required by the World Bank (IDA).

(ii) Procurement

97. Procurement activities under the proposed project will be carried out in accordance with 'The World Bank Procurement Regulations for IPF Borrowers' (Procurement Regulations), dated July 2016 and revised in November 2017 and August 2018, the 'Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants', dated July 1, 2016; and the provisions stipulated in the Financing Agreement.

98. The two Borrowers have jointly prepared the Project Procurement Strategy for Development (PPSD) identifying optimum procurement strategies for meeting the development objectives of the project, based on which the Procurement Plan for the first 18 months has been prepared, setting the selection methods to be used by the Borrower in the procurement of goods, works, non-consulting services, and consulting services under the project. The Procurement Plan will be updated at least every 12 months, or as required, to reflect the actual project implementation needs. Each update shall require the World Bank's approval and will be publicly disclosed in accordance with the World Bank disclosure policy.

99. **National procurement procedures.** National open competitive procurement procedures may be used while approaching the national market. National open competitive procurement will observe the requirements stipulated in the Procurement Regulations for IPF Borrowers on National Procurement Procedures. Other national procurement arrangements (other than national open competitive procurement), which may be applied by the Borrower (such as limited/restricted competitive bidding, request for quotations/shopping and direct selection), shall be consistent with the World Bank's Core Procurement Principles and ensure that the World Bank's Anti-Corruption Guidelines and Sanctions Framework and contractual remedies set out in the Financing Agreements apply.

100. The capacity of the PIUs was reviewed during preparation and was found to be adequate for managing the procurement activities for the project with the TA of a tender agent for conducting procurement and an owner's engineer for supervising the EPC contracts. Nevertheless, the capacity of the PIUs will be continuously monitored, during implementation, to ensure that both EDM and ESCOM can implement the project as required.

101. The procurement risk associated with the project, in view of the risks indicated earlier and the experience of previous World Bank-financed projects, is Substantial.

C. Safeguards

102. **ESIA/ESMP**. The project Environmental Assessment category is A. The proposed project is located in northwest Mozambique near Tete and southern Malawi. The selected project corridor in Mozambique and Malawi passes mostly through agricultural land and modified forest habitats. The corridor alignment in Malawi was selected to avoid an important high-biodiversity forest reserve. The project will not result in any major irreversible environmental impact in Mozambique or Malawi. The ESIAs/ESMPs have been prepared, consulted upon, reviewed by the World Bank and subsequently approved by the regulatory agencies (Environmental Affairs Department in Malawi, and the Ministry of Land, Environment and Rural Development in Mozambique) and disclosed in the two countries and on the World Banks's external website.[40] The implementation of the ESIAs/ESMPs will be managed by ESCOM's and EDM's environmental and social units, respectively. These units will be strengthened under the project through TA in Component 2.

103. **Environmental and social impacts**. Initial studies indicate potential physical or economic displacement of approximately 2,123 individuals to provide for the ROW of the transmission line. While these numbers are not final as they will be finalized when the RAPs are completed, as they would indicate the expected scale of social impacts. The situation of the PAPs along the border between Mozambique and Malawi will be assessed in the RAPs. According to the information provided by both utilities, the area has a very low-density population and it has been indicated that migrant PAPs will be treated as nationals and compensated in accordance to the laws of each respective country. The initial studies show that the majority of potential PAPs are small-scale farmers who will lose their crop fields (main source of subsistence/income), and there may not be sufficient land available of the same quality, productivity, and size for replacement within the vicinity of the project-affected areas. The availability of replacement land will be clarified during the preparation of the RAPs.

104. The initial studies provide estimates of PAPs within a 55 m proxy alignment located in the central axis of the 2 km wide corridor. According to this alignment, studies indicate that the project is expected to have an impact on an estimated 266 households with approximately 1,328 individuals in Malawi and an estimated 221 households with a population of approximately 795 persons in Mozambique. A number of households will need to be relocated, as an estimated 45 principal structures belonging to 34 households in Malawi and an estimated 40 principal structures belonging to different households in Mozambique are located in the proxy alignment. In addition, by its nature and scope, this project will typically entail complex institutional arrangements in a situation of prevailing safeguards capacity constraints in both ESCOM and EDM. These are likely to be aggravated by the transboundary nature and scope of the project.

105. The project site crosses the Rift Valley Escarpment in the west, with dissected and steep terrain, and in the east, the Plateau Area lies in the flat plains of the Mkulumadzi and Shire River Valleys. The project is within the Zambezian and Mopane woodland ecoregion, characterized primarily by woodlands dominated by mopane trees. While mopane communities are considered to be poor in endemic species, they support some of the largest and most significant wildlife populations in Africa. However, the corridor does not cross any protected area or forest reserve as, importantly, the

[40] The ESIA/ESMP for the Mozambique and Malawi sides of the project were disclosed on the World Bank's website on May 28th, 2019 and May 29th, 2019, respectively.

corridor was specifically relocated to avoid ecologically sensitive areas such as Nankudwe estate and Thambani Forest Reserve because of on-site technical survey and the results of the public consultation during the scoping phase. Where possible, the alignment follows existing linear infrastructure, reducing the additional habitat fragmentation and loss. Survey work has recognized that the project area crosses mainly moderately modified to considerably modified habitats because of the extent and longevity of cultivation and removal of indigenous plants in favor of agricultural crops.

106. During the construction phase, vegetation will be cut for the construction of access roads, under the ROW. Selective cutting will be carried out to keep low scrubby and herbaceous species that do not represent a risk for the powerline and all vegetation present at the edge of watercourses and on steep slopes will be retained. A botanist will be part of the site preparation team. Where removal of species of conservation concern is unavoidable, specimens will be collected with coordinates of each specimen and the description of their habitat will be recorded. Removals will be compensated, and the success of re-establishment followed through a revegetation plan to ensure that there are no net losses. One bird species classified at the national level as 'endangered' was recorded. The yellow-breasted apalis was confirmed to occur in the dry Brachystegia and open Savannah woodlands. To reduce potential impacts, vegetation clearing in the rainy season should be avoided due to impacts on nesting. Bird diverters will be installed on transmission lines along ecologically sensitive areas with monitoring implemented to check the levels of mortality and species involved. As three endangered species of fish are within the project area, the crossings will be controlled and limited, and measures will be taken to minimize disturbance at river crossings and, prevent sediments from erosion and pollutants and contaminants from heavy equipment entering water courses.

107. **RPFs**. The RPFs that clarify the principles and legal and institutional procedures for resettlement to be applied to individual investments have been prepared, consulted upon, and reviewed by the World Bank. The RPF for Mozambique was disclosed on the World Bank's website on July 26, 2019, and in Mozambique on August 1, 2019; while the RPF for Malawi was disclosed on the World Bank's website on June 24, 2019, and in Malawi on July 1, 2019. The issue of the legally required width of the special protection zone imposed by law for transmission lines in Mozambique being wider than the ROW considered in the preparation of the RPF is under consultation with Mozambican authorities and the terms of reference for the preparation of the RAPs have been prepared to reflect this. A practical approach for the RPF and ESIA was applied by using the center of the 2 km wide corridor as a proxy alignment to conduct the assessment. The actual alignment and tower locations will be determined as an outcome of the geotechnical and topographical surveys during project implementation leading to the preparation of a detailed design that will define the positioning of the tower footings.

108. **RAPs.** Country-specific RAPs are being prepared. The RAPs will be prepared in accordance with the laws of Malawi and Mozambique, as well as the World Bank safeguards policies, after agreeing on the approach to define the alignment and tower locations with the two utilities, which will be based on geotechnical and topographical surveys during project implementation. Once the RAPs have been completed, the documents will be reviewed by the World Bank and the regulatory agencies in Malawi and Mozambique. After the World Bank's approval, they will be disclosed in-country and on the World Bank's external website. Each RAP will include a section specifying if there are any migrants from the other country among the PAPs and the measures that will be put in place to ensure that they are treated in a manner consistent with World Bank policies. The RAP costs will be borne by the Governments of Mozambique and Malawi and will be approved by the World Bank before launch of construction works.

Other Safeguards Issues

109. **Environmental social health and safety.** Community and occupational health and safety plans will be prepared as part of the contractor ESMPs, derived from the project ESIAs/ESMPs, with detailed implementation and monitoring requirements for contractors and subcontractors during construction works to ensure worker and community health and safety, including protection of workers, promotion of safe and healthy working conditions, accessibility of grievance

mechanisms for all direct workers and contracted workers, and measures to ensure the security and well-being of surrounding communities during and after construction.

110. **Labor influx, gender, and vulnerable groups.** The contextual risk for GBV in Mozambique and Malawi is similar to other Sub-Saharan Africa countries. According to the latest Demographic and Health Survey 2011 in Mozambique, more than one in three women have experienced physical or sexual violence at some point in their life, with even higher rates found among young women ages 20–24. Mozambique has the 10th highest early marriage rate in the world with almost half of women ages 20–24 married before age 18 and one in seven young girls ages 20–24 married before turning 15. About 40 percent of adolescent women were mothers or pregnant, and this level of adolescent motherhood/pregnancy has barely changed in the last 15 years. Taking into consideration the contextual issues, the GBV risk assessment tool is being applied to the project to identify necessary mitigation measures that need to be included according to the World Bank's Good Practice Note 2018. Also, GBV risks and identification measures have been included in the ESIAs and RPFs, including the need for capacity-building activities of the PIU and code of conduct for contractors. The Clients will contract a specialized consultant to conduct an area-specific assessment of GBV/sexual exploitation and abuse (SEA) risks and available response mechanisms and services for survivors and prepare a prevention and response action plan consistent with the World Bank policies and the GBV Guidance Note. The action plan should be approved, and the recommended measures should be in place before construction mobilization starts. The ESMPs for the project include community health and safety components that integrate mitigation measures for GBV/SEA risks, such as contractors' code of conduct, labor influx management, and community awareness.

111. By its nature and scope the project has the capacity to attract external labor force. It is expected that contractors will bring in engineers and experienced equipment operators from outside the region, and they are likely to be temporarily housed in workers camps near the area during construction. The ESIAs/ESMPs take this into consideration and recommend rules for contractors to be incorporated in works contracts including measures for managing the potential impacts associated with the presence of an outside workforce on the local community such as the risk of an increase in communicable disease transmission, risk of social conflict, and possibility of GBV and SEA as well as the exploitation of children.

112. An initial screening rates the labor influx profile of the project as medium impact and, based on that screening and other factors, the project has been assessed to have a moderate to substantial risk of GBV/SEA due to the prevalence of drivers such as high levels of poverty, rural context of the project, the reported rates of SEA and social acceptance of at least one reason for spousal abuse, and high levels of child marriage. While GBV/SEA risks cannot be fully eliminated, the project will apply specific measures to avoid, minimize, and/or mitigate the risks related to GBV and SEA, such as including assessment of GBV risks in the project's ESIAs; adequate reflection of GBV risks; mitigation measures in project ESMPs and contractor ESMPs; clear definition of GBV requirements and expectations in contractor bid documents, including contractual sanctions and the use of a code of conduct which addresses GBV; preparation and implementation of labor influx management and camp management plans and GBV/SEA action plan; and availability of an effective grievance redress mechanism (GRM) with multiple channels to initiate complaints. In addition, the project will ensure incorporation of social and environmental mitigation measures into the civil works contracts, tracking environmental and social safeguards compliance on a regular basis during both construction and maintenance phases, and applying penalties to contractor payments if environmental and social safeguards are not fully complied with.

113. The ESIAs/ESMPs have identified potential gender-related impacts of the project and impacts on vulnerable people and has outlined mitigation measures to manage these including employment opportunities for women and youth; representation of women, youth, and vulnerable groups in consultations and resettlement committees; inclusive GRMs; PAP disaggregation by gender, age, and vulnerability; and safeguarding of compensations against male/elite capture.

114. **Gender.** At the utility company level, ESCOM is preparing a capacity-building plan and program and is designing a recruitment, mentoring, and leadership development program targeting potential, new, and existing female employees at ESCOM. To advance women's participation in the workforce in Mozambique, EDM has initiated the following programs: (a) increased awareness among the next generation workforce of potential economic activities or jobs through the 'Bring your Daughter to Work' program; (b) outreach to high school level educational institutions to attract youth to careers relevant for EDM; (c) technical visits to power sector facilities (such as generation plants or substations) for women in EDM's workforce, to increase their understanding of the business; (d) increase women's participation in management positions, through the introduction of gender targets in competitive selection processes; (e) preferential hiring for technical positions recently advertised (for example, *Central Termica de Maputo*); and (f) creation of a young professionals program. These women's employment efforts at ESCOM and EDM will be supported through various projects e.g. the Malawi Electricity Access Project (P164331) and the Mozambique Energy for All (ProEnergia (P165453) and also the Mozambique-Malawi Regional Interconnector Project to ensure a comprehensive approach. As part of the Market Operations Department being supported by this project, which will handle daily trading on SAPP market and bilateral trading that will result from the interconnector, 4 female staff from ESCOM and EDM will be trained and gain certification in market trading activities. Currently no women have this certification and skills profile in ESCOM and EDM indicating a gap in profile in this profession and sector. This will enhance the female technical talent pool and contribute to the closure of the identified gender gaps. In addition, a women's employment program is being launched under the Additional Financing for SAPP AREP Program MDTF (P163545) and links will be fostered to the activities such as dialogue with SADC and SAPP Management and Executive Committees and through cross-utility exchanges.

115. **Physical and cultural resources.** As part of the preparation of the ESIAs/ESMPs, a field survey was undertaken to identify and register, in an inventory, any cultural and/or archaeological heritage sites. A review of the 218 km length of the line aimed at identifying and documenting any traces of cultural and archaeological sites/remains along the powerline corridor and in adjacent areas to the proposed powerline, yielded one known location (Salifosi graveyard) of physical and cultural resources 20 m outside the ROW. Besides that, the proposed operation will entail physical works excavations/ quarrying and impounding, all of which raise the possibility of encountering both known and unknown physical and cultural resources. Chance finds procedures, therefore, have been elaborated in the ESIAs/ESMPs for the treatment of physical and cultural resources including archeological relics, fossils, human graves, shrines sacred trees, or groves that may be encountered in the course of project implementation.

116. **Capacity to manage safeguards.** To ensure that environmental and social safeguards issues are given adequate attention during the implementation of the project the World Bank has made recommendations to build the capacity of the implementing agencies. Based on an assessment of safeguards implementation in preceding projects, that is the ESSP (P099626), ESCOM's capacity to manage safeguards is found to be inadequate. This is due to limited staff (one environment and social safeguards staff) and limited experience in environmental and social risk management. While ESCOM has committed to a corporate reorganization that will fully staff an Environment and Social Unit and maintain experienced safeguards officers, it is recommended that ESCOM recruits a qualified environment/health and safety specialist and a social development/safeguard specialist to manage environment and social safeguards for the duration of this project in the event that the reorganization does not happen, is delayed, or is deemed inadequate. In addition, to enhance ESCOM's capacity, particularly in ensuring compliance with and enforcement of national regulations and requirements, it is proposed that support be sought through the district-level environment departments and regular capacity building be included in Component 2 of the project. In Mozambique, EDM has established, as part of another World Bank-financed project (TREP, P160427), an Environmental and Social Management System (ESMS). EDM is however undergoing a corporate reorganization and the placement and capacity of its environmental and social personnel is uncertain, with the planning and operations responsibilities, formerly assigned to the Environmental and Social Unit, now being allocated to two different units. While it is expected that EDM will establish its internal

environmental and social management functions soon, and the existing personnel currently assigned to the planning unit will be responsible for the preparation of safeguards instruments, presently, EDM does not have sufficient institutional capacity to handle the safeguard issues related to a regional project. EDM's environmental and social management capacity will be strengthened under the project through TA in Component 2, and through an ongoing World Bank-funded project implemented by EDM (PERIP, P158249). Both country's ESIAs/ESMPs include responsibilities of contractors and supervising engineers regarding environmental and social management of the project. The documents also recommend the establishment of PIUs with the adequate skills to support safeguards supervision.

117. **Climate and disaster risk.** Mozambique is ranked the third most vulnerable country to climate change in Africa, with climate change affecting 58 percent of the population and more than 37 percent of GDP by exposure to two or more natural hazards per year. Economic gains from growth and infrastructure development are significantly undermined because of recurrent water and weather-related hazards. Furthermore, stress on natural resources is expected to increase because of climate change, which will lead to more frequent and intense droughts, flooding, and extreme weather events. Temperatures are expected to increase by 1.4–3.7°C by 2060, while rainfall will decrease during the dry season (March–September) and increase in the wet season (October–February). An increasing number of floods will particularly affect the northern region of the country; this is where the proposed project will be built. Malawi is periodically affected by droughts, which limit agricultural production and power generation. The proposed investments will not increase climate impact. In fact, they will reduce the need for emergency diesel generation in Malawi, through energy supply primarily from Mozambique, which is predominantly produced from cleaner natural resources such as hydro and gas.

118. **Mitigation.** The feasibility and conceptual design studies prepared by international consultants, approved by EDM and **ESCOM**, have considered the risk of flooding and high wind speeds at the Zambezi River crossing. This will be mitigated by establishing a span sufficiently longer than the width of the river banks, thus preventing tower corrosion and foundation degradation during the rainy season. The clearance of the transmission line to river (highest water table) shall not be less than 25 m. The increased tower span and 25 m conductor clearance are achieved by applying four special towers, which are higher and stronger than the usual towers installed along the line. In this portion of the line, aluminum alloy conductor, steel reinforced (AACSR) with higher tension, will be used instead of the aluminum core, steel reinforced (ACSR) conductor used for the rest of the line. These modifications are done to adapt the line to the climatic conditions that are expected at the Zambezi River Crossing. With this improved design to suit the geographic and climatic conditions, the river crossing will cost US$4,943,200 per km as opposed to US$312,890 per km for the rest of the line on the Mozambique side. The total incremental cost is estimated at US$7,871,527.

(i) Stakeholder/Citizen Engagement/Beneficiary Feedback

119. As part of a broad citizen engagement process, the project will establish a project-level GRM within the PIUs to enable citizens and communities to raise general complaints, queries, and concerns about the project. The GRM will also provide a framework for resolving complaints and tracking/disclosing them for transparency. A series of public consultations will be held throughout project construction to raise awareness about the GRM and allow citizens to raise concerns in face-to-face meetings with ESCOM and EDM. A publicly disclosed summary of these consultations will be available to all citizens. The intermediate result indicator on 'annual public consultations events with citizens and publicly disclosing summaries/minutes of these consultations' will assess citizens' engagement. An independent monitoring entity will develop appropriate tools to be used during these forums to collect citizens' feedback on the project. Specific and actionable recommendations will be formulated to ensure that citizens' grievances are addressed, responded to and/or resolved within the stipulated response times, thus closing the feedback loop. In addition, the country-specific RAPs will have communication strategies that are targeted to PAPs and local communities in the project areas. The communication strategy will elaborate relevant and acceptable communications methodologies with the PAP including

women and marginalized communities, throughout the life of the project as well as information sharing and feedback techniques about all aspects of the project throughout construction.

(ii) Grievance Redress Mechanisms

120. The project will establish a project-level GRM, with multiple channels, to facilitate individuals and communities to voice/express general complaints, queries, and concerns including those not necessarily related to safeguards (OP.4.12 on involuntary resettlement). In addition, the country-specific RAPs will outline procedures through which PAP and communities will systematically raise grievances and concerns specifically related to land acquisition, resettlement, and compensation and how these will be effectively resolved and monitored. The proposed project GRM will take into consideration the established community and local-level feedback systems as an entry point, for which the traditional and local leaders, *Régulos*, will play an important role in receiving and directing the complaints to subsequent levels. A dedicated expert will ensure that all complaints received are written and treated with transparency and accountability. PAPs will be given an opportunity to present their grievances in local languages, with support from the project to translate if necessary. In addition, if a PAP disagrees with grievance resolution in the initial stages, the GRM will provide an opportunity to escalate it to subsequent levels such as the resettlement committees, district administrations, provincial governments, PIUs and finally the courts.

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

V. KEY RISKS

122. The overall risk rating of the proposed operation is "Substantial". Key risks that might impact the achievement of the PDO relate to the following:

123. **Political and governance risk (Substantial).** The lack of political buy-in at critical moments could lead to delays in project preparation and implementation. Political issues could also undermine the priority nature of the project for Malawi and delay urgent power flows by the proposed commissioning date. However, the project's components and content are demand-driven.

- **Mitigation.** The project closely responds to the needs prioritized by the two countries and will have significant economic and technical benefits for both countries. The project does not depend on other SAPP projects, but will pave the way for broader development of trade in the SAPP. Both utilities have agreed in April 2019 on commercial agreements for 50 MW of power trade. These agreements could be revised every five years.

124. **Macroeconomic (Substantial).** In Mozambique, although inflation has eased, and the exchange rate of metical has stabilized, the macroeconomic risks remain considerable as the country continues on a reduced growth trajectory. External risks are significant considering Mozambique's high level of concentration in commodity exports. Public finances consolidation efforts are gradually progressing, but debt levels remain high and fiscal space is limited. These risks could

affect EDM's operating environment through reduced demand, exchange rate volatility (as EDM's tariffs are in local currency while significant liabilities are foreign currency denominated), and budgetary/borrowing constraints as a state-owned enterprise. In Malawi, the past unstable macroeconomic situation which was reflected in high interest rates and government arrears has significantly affected micro, small and medium enterprises' access to finance and the willingness of the financial sector to lend to this segment. The substantial increase in inflation (reaching 24 percent in 2015), following the devaluation of the Malawian kwacha in the recent past and increase in policy rate of the Reserve Bank of Malawi (RBM) to 27 percent had a significant impact on the already high cost of credit. Macroeconomic conditions have recently eased (inflation, RBM policy rate, and T-bills rates are currently at 8.9 percent, 16 percent, and 14.5 percent, respectively), but these have not yet been reflected in the cost of credit as financial institutions are still pricing in higher risks due to higher non-performing loans.

- **Mitigation.** Macroeconomic risks are mitigated partially through concessional financing of the transmission line, and through the efforts to reduce sectoral costs, supported by the World Bank-financed investment projects and technical assistance. Much of the macroeconomic risks in both countries remain beyond the project's influence.

125. **Technical design risk (Substantial).** The infrastructure to be built poses limited risk in terms of technical operations. There is however a risk of under-utilization of the transmission line because of slower than anticipated demand growth or lack of generation capacity in the early stages of operation.

- **Mitigation**: The Owner's Engineer contract will include training for both utilities regarding O&M of high voltage lines and will be complemented by targeted training on those aspects under Component 2. The construction of the line is being phased, with the second line proposed to be strung in 2025. Demand growth shall be monitored during the early years to ensure that capital investment in the second line is scheduled to support the additional load as and when it is financially and economically justified. To ensure immediate use of the line, a bilateral contract between EDM and ESCOM has been agreed for 50 MW of firm capacity. ESCOM can also access the SAPP market immediately after the line is constructed. Additionally, ESCOM is in discussion with ESKOM South Africa for sourcing an additional 150 MW from ESKOM under a separate PPA to be wheeled through this transmission interconnector. It is recognized that ESCOM is negotiating commercial agreements related to interconnections for the first time. The services of a transaction adviser were mobilized to provide critical feedback on the structure of commercial agreements negotiated within the SAPP and in other power pools, and to provide legal and financial advisory support to ESCOM during negotiations.

126. **Institutional capacity for implementation and sustainability risks (Substantial).** Ineffective project coordination for preparation and implementation may affect the execution of the project. Without sound coordination at all levels of preparation and implementation, cross-border interconnection projects risk delays in execution that can reduce time-sensitive benefits. Weaknesses in implementation capacity have been identified during the delivery of donor-financed projects in both utilities.

- **Mitigation**: A JPSC and PIUs have worked to supervise the preparation of the feasibility study, ESIAs, tender documents, and RPFs. The JPSC with representation from the highest levels of the two governments and the boards of the two utilities, is actively monitoring project preparation progress against agreed deadlines and meets regularly to discuss bottlenecks and measures to alleviate the same. Both countries have agreed to deliver the project on a priority basis. To ensure an equally coordinated implementation, a single Tender Agent shall be engaged for the project to review the tender documents, to support the evaluation of proposals for the EPC contractor, and an Owner's Engineer will supervise construction. Measures to alleviate implementation issues are also being taken through capacity building and training in the areas of procurement, FM, and safeguards

monitoring and implementation. Both utilities, however, have the technical capacity to supervise and manage project implementation having invested in network construction and expansion in their respective countries.

127. **Environmental and social safeguards risks (High).** Environmental and social risks for this project have been rated High mainly because of the project's relatively large footprint, that may generate complexities because of its transboundary scope with possible migrants living across borders. While ESCOM has commenced the process of hiring additional environment and social safeguards staff, capacity in terms of skill and knowledge to manage environment and social risk still requires further enhancement. EDM's environmental and social unit currently consists of two environmental specialists, a sociologist and two surveyors/topographers, who currently handle all projects across the country. Recruitment of additional, suitably qualified staff is critical.

- **Mitigation.** With regard to this project, ESCOM will fill the current capacity gaps through recruitment and/or assignment of additional qualified safeguards (social and environment safeguards including health and safety) personnel. ESCOM will designate/hire a consultant to support safeguards within Component 1. Additional measures will include providing for budget within the project for continuous capacity enhancement of implementing agencies on environmental and social risk management and sustainability. A capacity assessment of ESCOM has been undertaken and as part of Component 2 of the project, a safeguards capacity-building plan will be prepared and implemented. The services of an external firm are being retained to support EDM and the implementation of the TREP (P160427) in developing the ESMS to help build capacity within the organization to manage environmental and social impacts. The assessment will benefit the implementation of the proposed project and EDM will also hire specialists to support implementation of the ESMS (EDM's Environmental and Social Unit will also be responsible for managing the environmental and social aspects of EDM projects).

128. **Stakeholder (Substantial).** The project involves various stakeholders, each of them playing key roles to ensure its successful implementation. Firstly, the two PIUs, pertaining to each of the utilities have a day-to-day role to procure and manage the contractors, ensuring that the project is completed on time. The interaction between these two parties is essential to the materialization of the project. Any disagreements or mismanagement between the two utilities could lead to implementation delays or cancellations as it has happened in the past. Secondly, the project financiers will also need to coordinate continuously to provide approvals, make payments, and provide the implementation support required. Third, the project also affects rural communities near the transmission line construction sites, who will be relocated and/or compensated. Any grievances and concerns of these stakeholders need to be carefully addressed to ensure smooth construction and operation of the transmission line.

- **Mitigation.** A Joint Project Coordination Committee has been established to help resolve any conflicts that may occur at utility level, and this will strengthen the working relationship of the two utilities during implementation. The financiers have agreed to maintain a joint proactive role to ensure coordination between the various parties during project implementation. The community concerns will be resolved through a consultative process established in the Stakeholder Engagement Plan, implemented by a specialist consultant.

129. **Other risk - Financial viability of EDM and ESCOM (Substantial)**. Given ESCOM's financial condition, the risk of ESCOM accumulating short-term arrears was discussed during project preparation against the experience of payment arrears within the SAPP. The PPA sets different layers of security for payment of the PPA, including a three-month commercial bank guarantee, which could be drawn upon by EDM in the event of failure of monthly payments from ESCOM. ESCOM is required to keep the commercial bank guarantee valid and replenished as applicable to the extent required throughout the remainder of the term of the PPA, until the payment obligations of ESCOM have been met in full. Parallel mechanisms to discipline the SAPP buyers and sellers, for example a regional facility that offers guarantees for short-term agreements could also be relevant for the project and are being discussed between the World Bank and SAPP.

.

VI. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Africa

Mozambique - Malawi Regional Interconnector Project

Project Development Objectives(s)

The project development objective is to interconnect Malawi and Mozambique's transmission systems to enable them to engage in bilateral and regional power trade in the Southern African Power Pool.

Project Development Objective Indicators

Indicator Name	DLI	Baseline	End Target
Wheeling capacity enabled by the project, and electricity traded between ESCOM and EDM.			
Wheeling capacity enabled by the project (Megawatt)		0.00	1,200.00
Increased annual electricity traded between ESCOM and EDM. (Megawatt hour(MWh))		0.00	360,000.00

Intermediate Results Indicators by Components

Indicator Name	DLI	Baseline	End Target
Mozambique – Malawi Power Transmission Infrastructure			
Construction of the transmission line. (Kilometers)		0.00	218.00

Indicator Name	DLI	Baseline	End Target
Project implementation contracts signed and effective. (Yes/No)		No	Yes
Technical Assistance and Capacity Building			
ESCOM Market trading unit established. (Yes/No)		No	Yes
Citizens' grievances responded to and/or resolved within the stipulated service standards for response times. (Yes/No)		No	Yes
Number of annual public consultation events with citizens and publicly disclosed summaries/minutes of these consultations. (Number)		0.00	2.00
Number of female staff in EDM and ESCOM trained and certified in market trading activities as part of the project. (Number)		0.00	4.00
Percentage of female technical and engineering staff at ESCOM. (Percentage)		10.00	15.00
Development and implementation of recruitment, leadership development, and mentoring program targeting females in STEM fields in ESCOM. (Yes/No)		No	Yes
Percentage of females hired under the Young Professional Program at EDM. (Percentage)		0.00	30.00

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Wheeling capacity enabled by the project	Transmission capacity in MW of the line constructed under the Project.	Semi-annually.	Progress report prepared quarterly by	Review transmission line construction progress report.	EDM and ESCOM PIU

			the Owner's Engineer.		
Increased annual electricity traded between ESCOM and EDM.	Incremental electricity traded between the two utilities, measured in MWh, enabled by the line constructed under the Project.	Semi-annually.	EDM and ESCOM Market Operator Departments .	Review Market Operator monthly reports.	EDM and ESCOM PIUs.

Monitoring & Evaluation Plan: Intermediate Results Indicators					
Indicator Name	**Definition/Description**	**Frequency**	**Datasource**	**Methodology for Data Collection**	**Responsibility for Data Collection**
Construction of the transmission line.	Percentage of progress in the construction of the transmission line as evidenced by the progress of invoicing for the contract. 100 percent when tests for the commissioning of the lines have been completed successfully. Sub-indicators have been allocated for each section of the line.	Semi-annually.	Project Progress Report prepared by the Owner's Engineer.	Review Project Progress reports and periodic site visits.	ESCOM and EDM PIUs.
Project implementation contracts signed and effective.	Owner's Engineer for the Transmission Line is appointed by the PIU and contract is effective. EPC contracts signed for all Lots	Semi-annually.	Project Progress Report and STEP.	Project meetings with PIUs, Review Project progress reports and procurement plans prepared by the	ESCOM and EDM PIUs.

	of the project.			Owners Engineer. Periodic site visits.	
ESCOM Market trading unit established.	ESCOM will establish a trading unit within its Market Operator Department to handle daily trading on the SAPP market and any bilateral trading that may result from the implementation of the interconnector.	Semi-annually.	Project Implementation Report	Review Project Progress report and periodic site visits.	ESCOM PIU
Citizens' grievances responded to and/or resolved within the stipulated service standards for response times.	Project Grievance Redress Mechanism established and operational as defined in the RAP.	Semi-annually.	Project Implementation Report.	Review Project Progress Report and periodic site visits.	ESCOM and EDM PIUs.
Number of annual public consultation events with citizens and publicly disclosed summaries/minutes of these consultations.	EDM and ESCOM will report how many interactions they have with communities to receive feedback about their project as part of the stakeholder engagement plan.	Semi-annually.	Supervision Consultant Reports.	Supervision.	EDM and ESCOM PIUs.
Number of female staff in EDM and ESCOM trained and certified in market trading activities as part of the project.	As part of the project, EDM and ESCOM will identify two women staff who will be trained to trade electricity in the regional market.	Semi-annually.	EDM and ESCOM Market Operator Departments, Utility HR departments.	Periodic meetings with EDM and ESCOM PIUs.	EDM and ESCOM PIUs.

Percentage of female technical and engineering staff at ESCOM.					
Development and implementation of recruitment, leadership development, and mentoring program targeting females in STEM fields in ESCOM.					
Percentage of females hired under the Young Professional Program at EDM.					

ANNEX 1: Southern African Power Pool

COUNTRY: Africa
Mozambique - Malawi Regional Interconnector Project

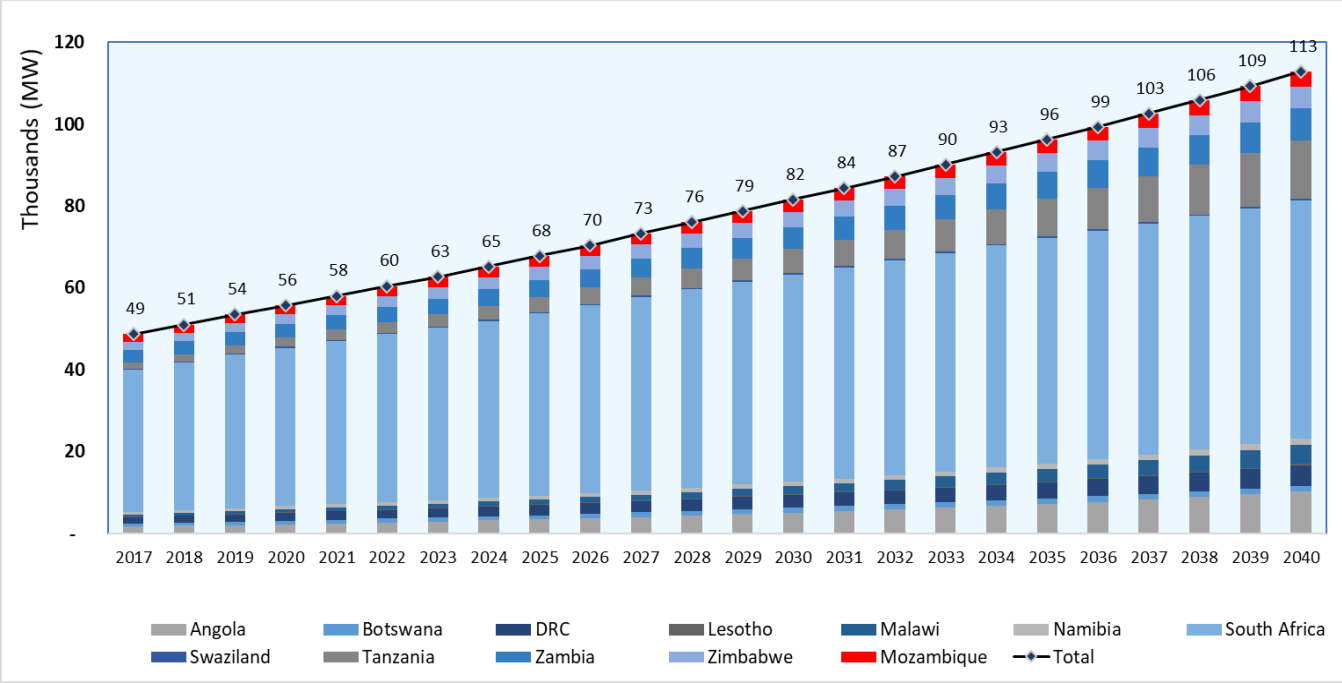
1. **Recognizing the importance of regional energy integration, in 1995, three years after its establishment, SADC created the SAPP.** The SAPP is the first and the most advanced power pool on the continent.[41] Its main objectives are to promote cooperation in regional electricity planning and operation, facilitate regional trading, increase access to electricity in rural areas, and ensure attractive investment environment through competitive tariffs. The SAPP has developed functioning multilateral competitive markets (intra-day, day-ahead, weekly, and monthly forward physical markets), the only power pool in Africa to do so. It has established a coordination center in Harare (Zimbabwe), which monitors the operation of the power pool and adherence to the operating rules, advises on feasibility of wheeling arrangements for bilateral trade, and operates the competitive markets. Currently there are 17 members in the SAPP, 12 utilities, and three private sector entities (Copperbelt Energy Corporation, Lunsemfwa Hydropower Company, and Ndola Energy Company) and two publicly owned companies (HCB and MOTRACO).

2. **Electricity demand in the SAPP region is set for long-term growth as electrification programs have advanced in the region.** There is a general consensus that electricity demand in the Southern Africa Region will keep growing in conjunction with increasing electrification and economic growth prospects. The average access to electricity in the SAPP region was only 37 percent in 2016 (27 percent excluding South Africa), with the level of access quite uneven across countries. South Africa is the only member that exceeds 80 percent and only in three other countries it exceeded half of the population: Botswana (61 percent), Namibia (52 percent) and Swaziland (66 percent). In the remaining countries it ranged between 11.0 percent (Malawi), and 40.5 percent (Angola). Electrification programs are a developmental priority in all the countries, with a shared objective of achieving near-universal electrification by 2030, consistent with the United Nations SDGs. Achieving this objective will require large investments across the electricity (and energy) supply chain, including in national and regional electricity infrastructure.

3. **Currently, regional demand outstrips available supply.** The SAPP Pool Plan Study (2017) forecasts that, in the base case, electricity demand in the SAPP region at the level of net generation will, by 2040, reach about 700 TWh, with peak regional demand at 113 GW (coincidental or 'after diversity' peak,[42] figure 1.1), from the level of energy demand of 292 TWh in 2016 and 49 GW peak demand in 2017.[43] This contrasts with the available generation capacity of about 54.7 GW in FY17. To meet the projected demand with the requisite reliability of supply, generation capacity will need to expand to at least 130 GW.

[41] Sub-Saharan Africa has three other power pools, listed here in the decreasing order of their institutional development and physical integration: WAPP, EAPP, and CAPP.
[42] A peak demand in an integrated market is generally lower than the sum of the peak demands of market members, as the timing of the peak demands in the individual markets generally differs. Therefore, integration of markets leads to a lowering of the integrated market-level peak demand, which is a major benefit of integration, as this reduces total investments needed to meet the peak demand.
[43] SAPP Pool Plan 2017, SAPP, December 2017. ('Net generation' of a plant is electricity generated by the plant and delivered at the point of its connection to the grid that is, it excludes self-consumption of the plant).

Figure 1.1: Peak Demand Projections of the SAPP

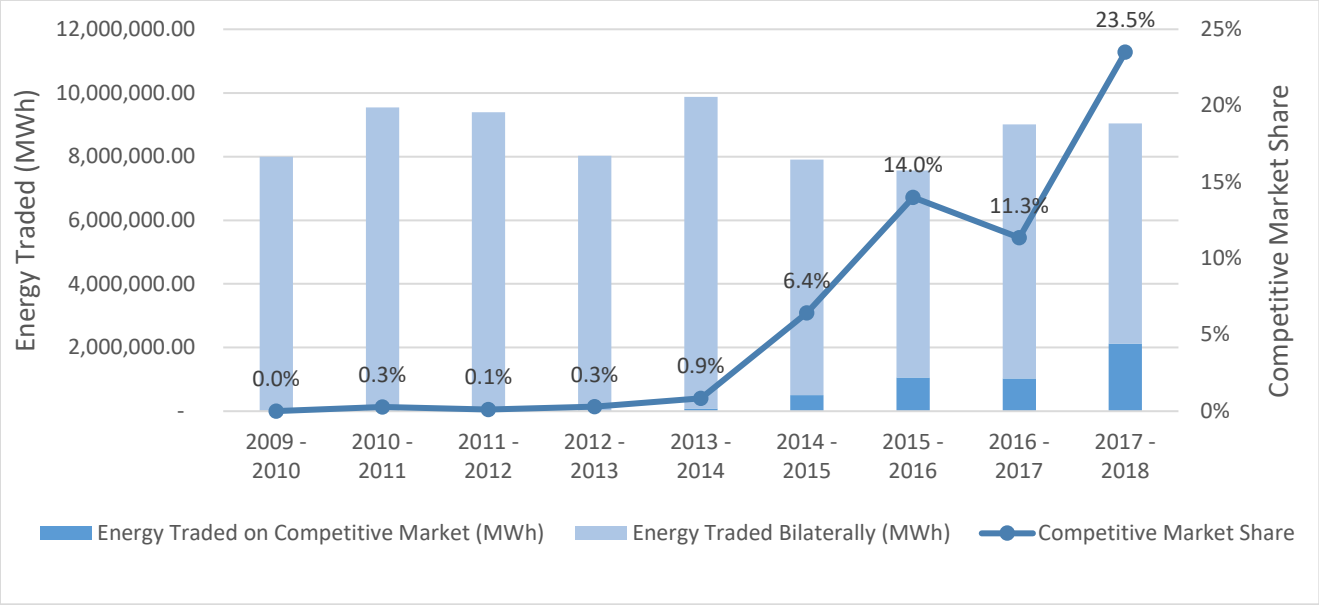


Source: SAPP Pool Plan 2017, SAPP, December 2017.

4. **Substantial cost savings are possible if the generation and transmission infrastructure is optimized at the regional level, rather than for each country individually.** A significant part of the savings comes from avoiding building excess generation capacity, that is, by strengthening regional interconnections and optimizing the generation portfolio at the regional level. The SAPP Pool Plan study projects that Mozambique and the DRC should be the largest regional exporters of electricity and Malawi one of the largest importers.

5. **Transmission constraints have emerged as a key bottleneck in trade expansion in the SAPP region.** The SAPP competitive markets have gained ground (figure 1.2). In FY18 (April 2017 - March 2018), the total trade in the SAPP was about 9 TWh, of which 7 TWh was traded through bilateral contracts and about 2 TWh through the competitive short-term markets. In FY17, the competitive trade would have been almost three times higher (from about 1 TWh to 2.8 TWh), if it were not for transmission constraints; in other words, about two-thirds of the matched bilateral trade could not be executed because of transmission constraints.

Figure 1.2. SAPP Bilateral and Market Trade Volumes



Source: EDM Data 2019.

6. **Both Malawi and Mozambique will benefit from the proposed interconnector.** The SAPP Pool Plan (2017) shows the mutual benefit of the proposed interconnector. Mozambique, at the start of the plan period, has a comfortable reserve margin (30 percent). This evolves across the period as Mozambique increases its generating capacity from the existing figure of about 2,500 MW faster than demand growth over the period (figure 1.3). The initial reserve margin in Malawi is negative (-22 percent) and peak demand could be met through imports if the country was connected to the neighboring networks. Generation capacity expansions in Malawi could result in satisfactory levels of reserve margin from the mid-2020s (figure 1.4). However, the capacity installed fails to meet peak demand over the period, suggesting an ongoing reliance on imports. The long-term export-import relationship between the two countries is evident, and the proposed transmission infrastructure is the key element required to make this arrangement work.

Figure 1.3. Supply-Demand Balance for Mozambique 2017 – 2040. Source: SAPP Pool Plan – August 2017

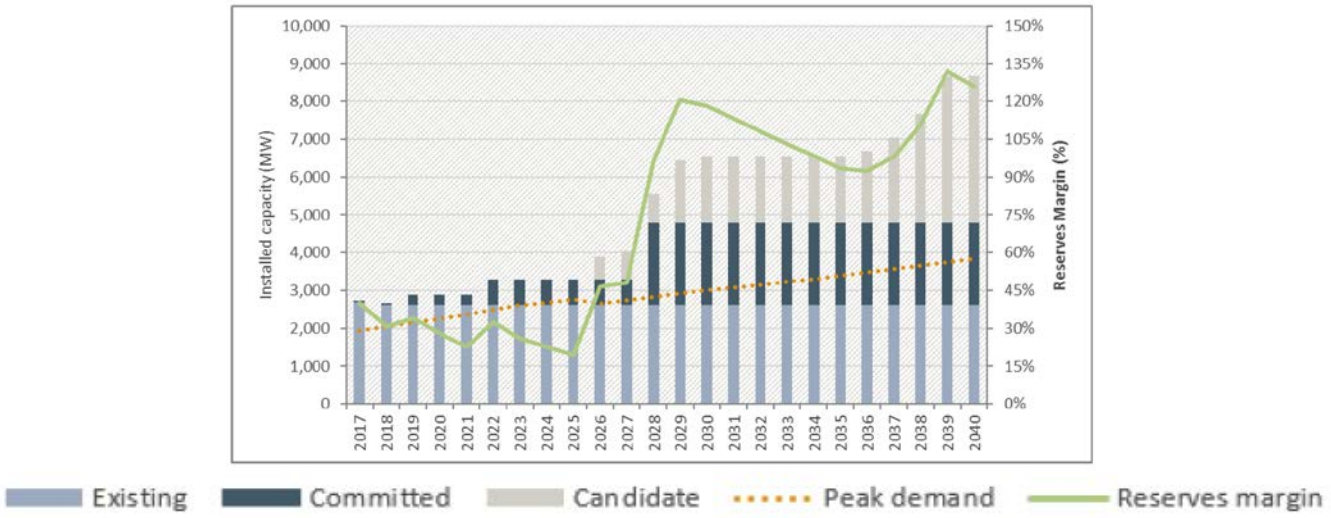
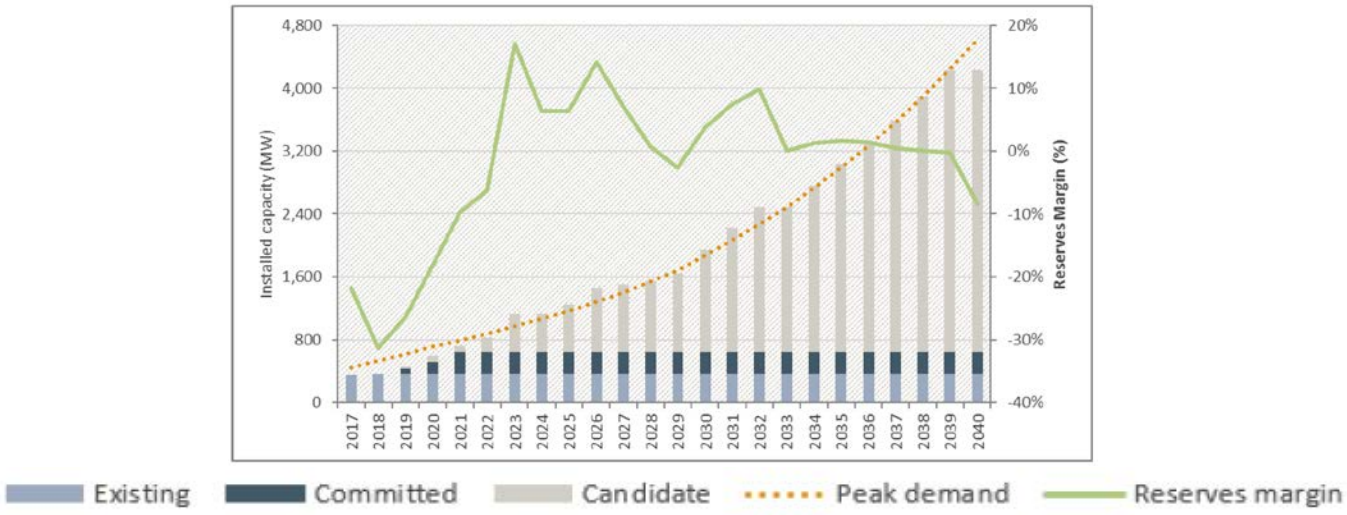


Figure 1.4: Supply - Demand Balance for Malawi 2017 – 2040. Source: SAPP Pool Plan – August 2017



ANNEX 2: Detailed Project Description

COUNTRY: Africa
Mozambique - Malawi Regional Interconnector Project

1. In 2013, the Governments of Malawi and Mozambique signed a Memorandum of Understanding (MoU) for interconnection of their power systems with construction of the Mozambique - Malawi Interconnector Transmission Line from the Tete region in Mozambique to Phombeya Substation in Malawi. It allows a power transfer between both countries and can therefore reduce power outages due to the shortage of generation capacities, in both countries.

2. The interconnector is a relatively short (about 218 km long transmission line) but highly important interconnection that would interconnect Malawi with the ring on the eastern side of the SAPP. The transmission line will start at Matambo Substation in Mozambique and traverse into Malawi to connect with the Phombeya substation. Matambo is being connected with the future Mozambique STE regional backbone interconnection which has dual lines that would interconnect central and southern Mozambique and provide an HVDC link to demand in the region. Matambo is also interconnected with the north-eastern coast of Mozambique.

3. Transmission capacity of the interconnector has been determined based on the feasibility study for the Mozambique - Malawi Transmission Line completed in October 2017. The design capacity is adequate to accommodate energy flows estimated for the needs of the two countries. The load flow calculations were done using the power system analysis software DIgSILENT Power Factory. The SAPP model for Mozambique was used to create an integrated model for the Malawi and Mozambique power systems. The development stages considered in the study are the year of implementation of the Mozambique - Malawi Interconnector and 5 and 10 years after implementation. 2021 is the expected year for commissioning of the interconnection line in the model. Therefore, the load flow calculations have been carried out for 2021, 2026, and 2031. A 1200 MVA interconnection capacity is suitable for power exchange considering the different load and expansion scenarios as well as different seasons, dry and wet operating conditions. The 400 kV transmission line will be built as a double-circuit line with only one circuit installed initially and the second circuit installed at a later stage, in 2025. Under system disturbances, the double circuit line can provide n-1 redundancy in case of outages caused by lightning strikes or other causes, whereas the single circuit line does not allow power transfer in case of system failure. The line's carrying capacity under a single circuit configuration would be 1,200 MW, while for the double circuit line the capacity would be 2,400 MW.

4. The proposed project will consist of two components: (a) Mozambique - Malawi Power Transmission Infrastructure, and (b) Technical Assistance and Capacity Building.

Component 1: Mozambique-Malawi power transmission infrastructure (estimated total cost: US$127 million equivalent, of which IDA grant is US$41 million, and IDA credit is US$13 million)

5. Funding from the regional and country IDA allocations, the World Bank-administered NTF, and KfW (through grants from the Government of Germany and the EU) will be made available for this component.

6. The project design consists of constructing a 218 km, 400 kV double circuit transmission line (second line to be strung by 2025) between the new 400 kV Matambo Substation in Mozambique to be constructed under this project and extension of Phombeya Substation in Malawi interconnecting the electricity networks of the two countries, of which approximately 142 km will be in Mozambique and 76 km will be in Malawi. The Mozambique

connection point will be located in the Tete region at Matambo Substation. The Malawi connection point will be the Phombeya Substation in the Southern region.

7. The 400 kV transmission line is expected to cross the Zambezi River at around 12 km south of the City of Tete. The crossing location has been selected at a distance of around 300 m of an existing 220 kV transmission line crossing (line to Vale Coal Mine). The river crossing span is about 1.7 km. The engineering and design of the interconnection line will ensure that the interconnector will be fully functional and will be able to transfer 1,200 MVA (single circuit configuration) initially and 2,400 MVA with double circuit line by 2025.

8. Based on the design consultant's final feasibility report (December 2017), the project will include the following:

Mozambique

- Installation of approximately 142 km of 400 kV transmission line including a 1.7 km Zambezi river crossing.
- Installation of a new 220/400 kV, 500MVA Substation at Matambo with transmission line bays, transformer bays, and reactors (if required).
- Installation of a 'short' 220 kV transmission line connection to the existing Matambo 220 kV Substation.
- Extension of the existing Matambo 220 kV Substation.

Malawi:

- Installation of approximately 76 km of 400 kV transmission line.
- Extension of Phombeya Substation: Transmission line bays and reactor bays

Transmission Line

9. Different design alternatives were considered in single and double circuit line configurations: (a) a 400 kV single circuit line; (b) a 400 kV double circuit line; (c) a 400 kV phased double circuit line with second phase to be strung by 2025; and (d) a 400 kV parallel single circuit line. The third alternative, a 400 kV phased double circuit line with second phase to be strung by 2025, has been chosen considering n-1 redundancy because installation of the double circuit line allows power transfer in case of system failures due to, for example, lightning strikes whereas a single circuit line would not allow for power transfer in case of system failure. The following main factors were considered to affect the design of the transmission line and the towers: (a) wind speed and related air density and pressure; (b) maximum and minimum temperatures; (c) solar radiation; (d) lightning incidence; (e) pollution; (f) expected seismic loadings; (g) conductor maximum working temperature; and (h) rated switching overvoltage, lightning, and nominal power voltages.

10. The design of the transmission line mainly consists of self-supported steel lattice tower structures; special towers require realizing the crossing over the river. The ACSR triple bundle tern conductor (3x Tern) is the most suitable configuration from a technical perspective, to transfer 1200 MVA (initially single circuit line), and the economical point of view. The conductor 'Tern' is also considered to be the standard conductor under the STE project. Double bundle (2x) AACSR/ AW Pastel 865 will be used for river crossing to provide reduced sag. The composite type insulator has been considered. The lines will be equipped with optical power ground wire (optical fibers integrated in the ground wire of the overhead lines) for the telecommunications system and supervisory control equipment.

Substations:

Mozambique

(a) *220/400 kV, 500 MVA Matambo Substation (new Substation):*

11. The terminal substation in Mozambique is intended to be a major substation hub for the future 400 kV transmission system in Mozambique. The basic design of the new 400 kV Substation (location, configuration, layout and so on) has been determined under the STE project.

- 400 kV double busbar with bus coupler and Current Voltage Transformers.
- Two bays for the Mozambique-Malawi Interconnector.
- Two bays for the 400/220 kV transformers for the interconnection to the existing 220 kV substation.
- Several bays for transmission lines to Cataxa, Lupata, Benga, and so on (which can be constructed at a later stage).
- Allocated space for future bays.
- HVDC switchyard.
- Substation building(s) housing all protection and control, Supervisory Control and Data Acquisition (SCADA), and telecommunication.

12. In addition, the following work is required for the installation of the new substation:

- Removal or relocation of existing antenna on the south-east side of the existing 220 kV substation.
- Relocation of the existing road passing the substation on the west side.

(b) The existing 220/66/33kV Matambo Substation

13. For the configuration of the Interconnector as a double-circuit with only one circuit installed initially, the 220 kV Matambo Substation will be extended with the following bays:

- One bay for the 220kV transmission line 'link'.
- One 'empty' bay for a second 220 kV connection in future.

Malawi

(a) 400 kV Phombeya Substation.

14. The Phombeya substation in Malawi (Phase 1), will be extended for the integration of the Interconnector into the power system in Malawi. The Phombeya substation is a 400/132/33 kV substation and is configured in a 'double bus single breaker' arrangement when fully constructed. For the Mozambique - Malawi Regional Interconnector project, Phombeya Substation is considered to be in service with the completion of Phase 1 construction. For the configuration of the interconnector as a double circuit with only one circuit installed initially, Phombeya Substation will be extended with the following bays:

- One bay for the 400 kV transmission line.

- One spare bay for the future installation of the second 400 kV circuit.
- One bay for the 400kV shunt reactor.

(b) 400 kV and 220 kV Switchyard main equipment

15. For the 400 kV switchyard, SF6 type of circuit breakers, suitable for single and three-phase multiple and rapid auto-reclosing, shall be used. All switches shall be equipped with motor drives, although manual operation shall be possible. The disconnectors shall be of the center-break type except the disconnectors for the main bus at Phombeya Substation, which shall be of the pantograph type. Voltage transformers shall be of the capacitive type, single-phase, with one end of the primary winding directly earthed, and they shall be installed on separate supports. Current transformers shall be single-phase and directly installed on separate supports. For measuring and protection, the same current transformer with multiple secondary cores shall be used.

16. The 400/220/33 kV, 500 MVA autotransformer shall be an oil-insulated outdoor type. The transformer shall be made of three single-phase units due to restricted road/traffic capabilities, the maximum transport weight is limited to approximate 60 tons. Therefore, the transformer shall be constructed and provided as three single-phase units. Furthermore, providing one spare single-phase unit will be a cost-effective approach to limit outages in case of a transformer failure or maintenance of one unit. Sizing of the transformer is based on the results of the network analysis. The size 500 MVA as determined by worst-case load flow calculations is in line with the proposed transformer capacity under the STE project (2 x 250 MVA). However, since the capacity of 500 MVA is already needed for the power flow in 2021/26 after commissioning of the interconnector, installing one transformer with 500 MVA, will be less expensive than installing two transformer bays, each with a 250 MVA transformer. A 400 kV shunt reactor shall be installed in the 400 kV switchyard. All shunt reactors shall be three-phase, oil immersed and outdoor design type.

Control and Monitoring System

17. The Substation Control and Monitoring System (SCMS) monitors and controls breakers, transformers, and other primary field devices from an operator desk (Human Machine Interface) in the control room of a substation. The SCMS accommodates any existing intelligent electronic devices (IEDs) and fully integrates new technologies and equipment for control, protection, disturbance recording, and monitoring. Therefore, the installation of an SCMS enables both local substation-level control and monitoring as well as remote control and monitoring from related National Load Dispatch Centers (NLDCs):

- NCC (National Control Center) Malawi at Blantyre Chichiri.
- Future NLDC in Maputo.
- HCB Matambo Substation Control Center (future Back-up NLDC in Mozambique).
- Future SAPP Load Dispatch Center.

18. SCMS/SCADA and Telecommunication will be prepared after discussion with the implementing agencies.

19. The transmission line and substations will be constructed according to International Electrochemical Commission and internationally accepted technical criteria and standards.

20. The implementing agencies require technical support for the engineering design and tendering process, construction supervision, and TA during the defects' liability period. Therefore, a consultant was appointed for preparation of engineering design and bidding documents. A tender agent has been selected to provide technical and management support to the PIUs during the tender process. An Owner's Engineer will support EDM and

ESCOM with project management, including oversight of implementation of the ESMPs, and construction supervision and undertake post construction activities, including training for the client's staff.

21. ESCOM has conducted a power system study to analyze the two power systems working in a synchronous and safe mode. During this study, simulations for measurements and testing of generators, excitation and governor systems were performed at the specific power station units according to the approved test plans. Further, measurements and validated dynamic models for the existing ESCOM generation plants were developed (including detail of the tests undertaken at the various power stations; the results obtained; and the derived models for the generator, excitation, and governor systems).

22. The power system study included load flow, transient stability studies, frequency stability studies and small signal stability studies and recorded six different study scenarios. A review of the excitation system settings was done based on the transient and small signal stability studies to determine optimum settings and if any settings needed to be changed. A review of the governor settings was done based on the frequency stability studies to determine optimum settings. All settings were tested on the relevant DigSilent Power Factory case files. This file was integrated with the SAPP network model for the purposes of performing small signal studies. Controller tuning changes for dynamics models were recommended where appropriate, based on the outcomes of the stability studies.

Table 2.1. Estimated Project Costs

Item	Cost (US$, Millions)
400 kV Transmission Line	71.954 (Mozambique: 48.898; Malawi: 23.056)
Matambo Substation	23.752
Phombeya Substation	4.254
Total construction cost	99.960
Contingencies (10%)	9.996
Engineering (5%)	4.998
ESIA	7.200
Owners Engineer (5%)	4.998
Total project costs	**127.152**

Component 2: Technical Assistance and Capacity Building (estimated total cost of US$3 million, of which IDA credit is US$2 million and IDA grant is US$1 million).

23. This component will have two sub-components, Sub-component 2-A for Mozambique and Sub-component 2-B for Malawi, to support the implementing agencies (EDM and ESCOM) in project management, including safeguards supervision, as well as mitigation of GBV risks and implementation of a gender action plan for the proposed transmission line, and related capacity building and training. It will also support market development studies for the additional capacity on the line. The TA is proposed to be funded by IDA.

Climate Co-benefits Assessment

24. Under the commercial agreements signed between EDM and ESCOM, it is estimated that the high voltage transmission line will initially allow for 320 GWh of energy to be transferred from the Mozambique northern network to Malawi. The Mozambique network is split into two separate grids, a southern grid and a northern grid.

The proposed project will connect the Malawi network to the northern Mozambique network, which is 100 percent hydro based (Hydro Cahora Bassa, Mavuzi and Chicamba). The energy to be supplied by the interconnector will displace the need for emergency diesel generation in Malawi at US$¢45 per kWh.

Table 2.2. Benefits Summary for Malawi

	Per Year	2022 – 2031
Diesel generation displaced (GWh)	320	3,197
Avoided cost (US$, millions)	82	821

ANNEX 3: Implementation Arrangements

COUNTRY: Africa
Mozambique - Malawi Regional Interconnector Project

1. The two national power utilities, ESCOM and EDM, will be responsible for the implementation of the Malawi and Mozambique portions of the project, respectively. To coordinate the project implementation process and address any issues that arise because of the regional nature of the project, a three-level structure has been put in place and is fully operational.

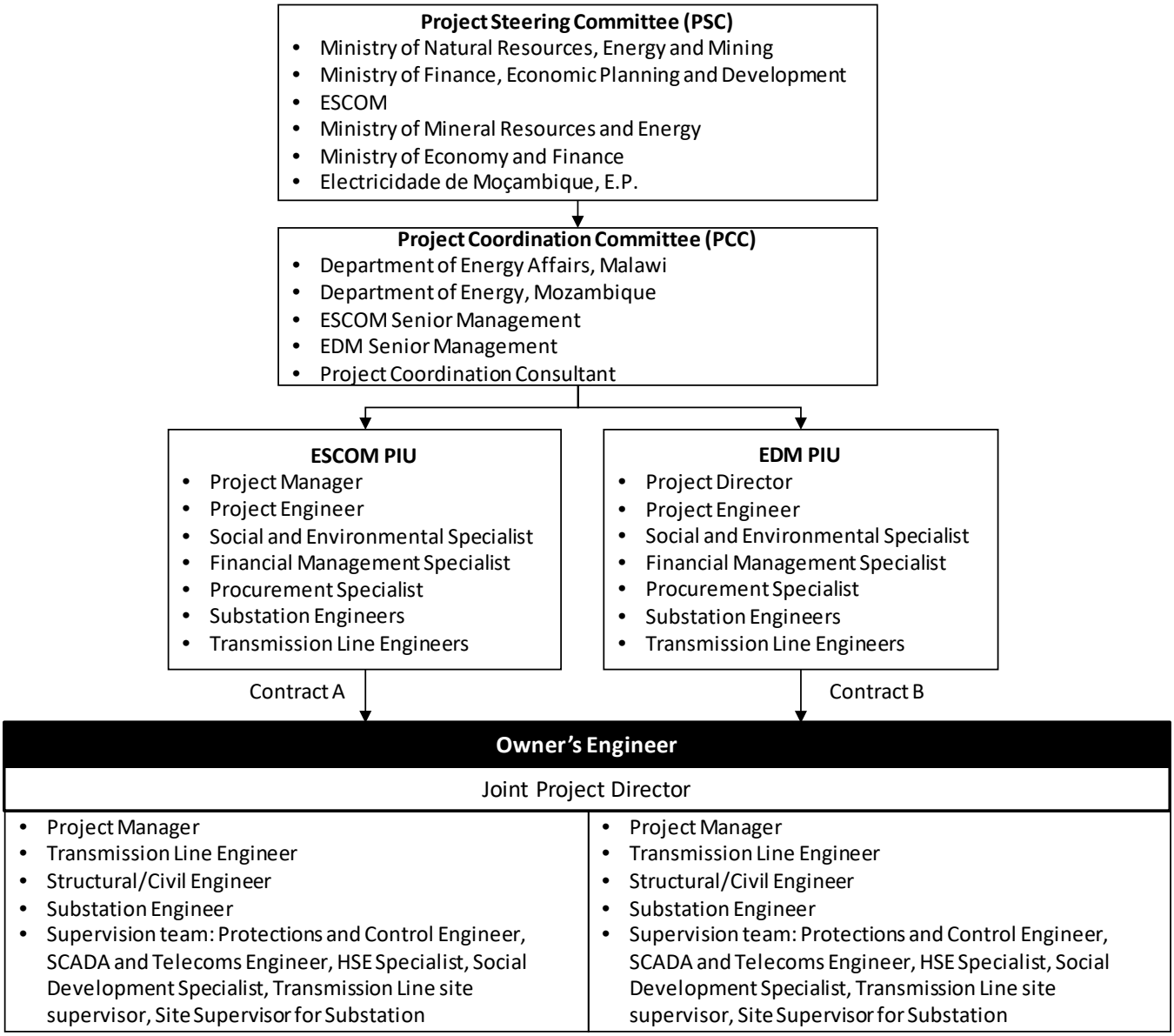
2. The first, at the governmental level, is a JPSC, comprising senior staff from, on Malawi's side, the Ministry of Natural Resources, Energy, and Mining; Ministry of Finance, Economic Planning, Development; National Electricity Council (or successor entity); and ESCOM; and, on Mozambique's side, MIREME, Ministry of Economy and Finance, and EDM. The JPSC will provide oversight and meet to address any issues that need to be resolved at the government level, including facilitating any authorizations or approvals required for project implementation and evaluating the overall progress of the project. The JPSC was instrumental in reaching a consensus on the commercial agreements. The committee will meet at least every six months during the first two years of the project, and at least once a year subsequently until project completion.

3. The second, at the utility management level, is a JPCC, comprising of the Department of Energy Affairs, Malawi; Department of Energy, Mozambique, and senior management from the two utilities. The JPCC reports to the JPSC. The JPCC is responsible for high-level project coordination. This committee can also refer any critical issues to the JPSC.

4. The third level is operational. ESCOM and EDM will each have a PIU, which will be supported by the Owner's Engineer, as well as a Tender Agent. For the two utilities, the PIUs will include a project manager, a project engineer, a social and environmental specialist, an FM specialist, and technical specialists including transmission line and substation engineers and a staff member familiar with the World Bank procurement guidelines. The PIUs will be responsible for drafting procurement documents for works and services (including terms of reference, pre-qualification, tender and supervision, and working with consultants as necessary). The supervision consultant, also referred to as the Owner's Engineer will be hired by ESCOM and EDM under a single contract. ESCOM and EDM will each pay a percentage of the supervision consultant's costs, depending on the utility to which the costs are attributed. The PIUs will be in regular contact with each other. Training and capacity building for the ESCOM and EDM PIUs will be included in Component 2 of the project. ESCOM and EDM both have functioning management units in charge of special projects. The M&E function will be fully embedded in these PIUs and the PIUs will prepare quarterly and annual progress reports to be submitted to IDA and to be presented to the JPSC and JPCC as required. Indicators for results monitoring have been designed to be managed by the utility project managers.

5. Figure 3.1 illustrates these three levels of institutional management structure.

Figure 3.1. Project Institutional Management Structure



Key Agreements

6. A series of agreements were signed between EDM and ESCOM and set out the terms under which (a) the project will be financed and implemented; and (b) the transmission interconnection will be operated, once the project has been completed.

7. Five agreements were signed on April 11, 2019. These are (a) the PPA; (b) the 'Wheeling Agreement';[44] (c) the Project Implementation Agreement; (d) the Maintenance Agreement; and (e) the System Operating Agreement.

8. The PPA has been negotiated between EDM, as the supplier of power for Malawian imports, and ESCOM, as the net import purchaser. The PPA sets out (a) the tariff; (b) the quantity of supply of electricity that ESCOM undertakes to purchase from EDM (that is, the MW of generation capacity earmarked for ESCOM); (c) the tenor of the contract; (d) the mechanism for payment and procedures in case of arrears; (e) the payment guarantees required from the buyer; and (f) the methodology for annual adjustments.

9. The 'Wheeling Agreement' is signed between the two implementing and operating utilities, EDM and ESCOM. The agreement lays out the intention that the line will be used for both import and export from Malawi and EDM. It specifies the charges to be paid by ESCOM to EDM for use of the Mozambique portion of the line in the case of ESCOM wheeling power. The payments made by ESCOM to EDM will be a fixed monthly amount, to be paid over 20 years, that represents repayment of the investment for a portion of EDM's part of the line. The payments under the Wheeling Agreement will be made by ESCOM regardless of any actual import or export of power over the line. A similar approach will be done once the second phase of the project is completed, in which EDM will pay ESCOM. The annual payment under the Wheeling Agreement is calculated according to a formula that includes (a) the overall investment costs related to the interconnection on the Mozambique side of the border (to be based on actual cost) and (b) an 'Annual Cost Recovery Factor' for the financing derived from country allocations, which factors in the cost of capital for EDM and a mark-up for EDM to cover the costs and risk of undertaking the project. The payments made by ESCOM to EDM under the Wheeling Agreement will not result in any ownership of assets financed by the project on the Mozambique side of the border.

10. Similarly, the Implementation Agreement was concluded between EDM and ESCOM. It describes the means by which the physical implementation of the line shall occur, focusing particularly on management and accountability for project delivery. It sets out the project management structure, including the roles of the JPSC and the JPCC, as summarized earlier. It sets out the project reporting structure, by which information on project implementation will flow from the two PIUs to the JPSC. It also describes the physical properties of the interconnection transmission line (including the principal lots for contracting works, goods and services that will need to be procured) and the activities that have already been undertaken as part of the interconnection project (including feasibility and environmental studies).

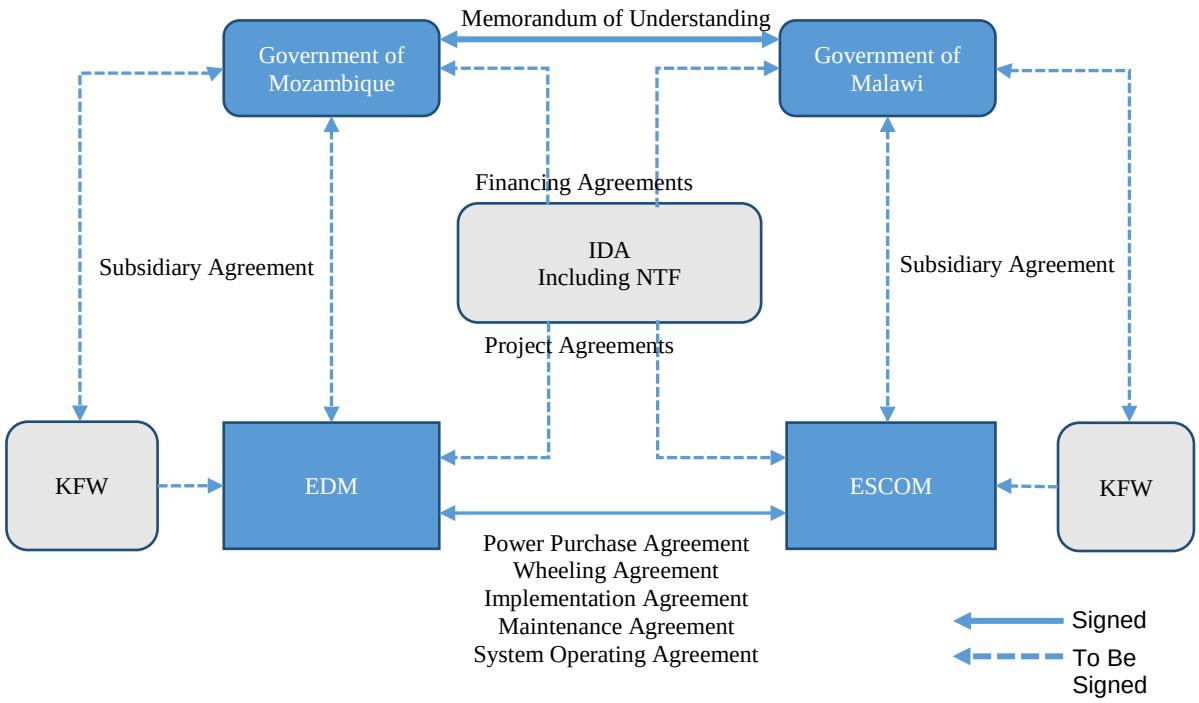
11. The Maintenance Agreement has also been signed between EDM and ESCOM. It sets out the specific responsibilities of EDM and ESCOM with respect to the quality and schedule of maintenance of the line, including planned and unplanned maintenance, and costs and liabilities in the case of failure to implement the maintenance agreement. Under the agreement, the parties will exchange maintenance schedules before the end of each year for the succeeding year. There will be an annual O&M charge, calculated as a fixed percentage (2 percent) of the overall investment costs (including interest and contingency).

[44] The Wheeling Agreement is not a traditional Wheeling Agreement which establishes the capacity charge for each kilowatt hour transferred through the Line. In this case the Wheeling Agreement establishes a fixed capacity charge which is paid monthly by ESCOM to recover portion of the capital invested on the Mozambique side.

12. The System Operating Agreement has been signed between EDM, ESCOM, and HCB. EDM may retain the services of HCB as the system operator for the Matambo Substation, given the complexities involved in operating a 400 kV system and the skills required to do so efficiently. This agreement specifies the basis for operating and maintaining the transmission line and the interconnection systems. Under this agreement, a Joint Operating Committee with equal representation from EDM and ESCOM, will be set up to establish the operating procedures required to obtain the maximum benefits from operation of the interconnection with Malawi; establish interchange procedures (for example, meter reading, energy recording, and accounting); ensure that spinning reserve requirements are maintained by the parties, establish operating procedures for carrying reactive loads by one system to another to ensure adequate service conditions and economical use of the facilities; and determine or decide upon other related matters. The Joint Operating Committee will make recommendations to the parties concerning coordination of maintenance schedules, coordination of power and energy interchange procedures, installation of any relaying or control equipment, and any amendments and revisions to this agreement. The chairmanship of the Joint Operating Committee shall rotate among the parties on an annual basis.

13. In addition to these key agreements, in 2013 an MoU was signed between the Governments of Mozambique and Malawi, which sets out in broad terms the aims and objectives of the transmission interconnection project. Figure 3.2 summarizes all the agreements relevant to project implementation and financing.

Figure 3.2: Project and Commercial Agreements for the proposed project



Financial Management, Disbursements and Procurement

Financial

14. The World Bank's FM assessment of EDM and ESCOM concluded that the project's FM arrangements meet the World Bank's minimum requirements under the Directives and Policy for IPF. The overall residual risk rating for the project is Substantial.

15. The objective of the FM assessment was to determine whether the FM arrangements will (a) ensure that funds are used only for their intended purposes in an efficient and economical way while implementing the agreed activities; (b) enable the preparation of accurate and timely financial reports; (c) ensure that funds are properly managed and flow smoothly, rapidly, adequately, regularly, and predictably; (d) enable project management to monitor the efficient implementation of the project; and (e) safeguard the project's assets and resources. The assessment complied with the World Bank Directive: Financial Management Manual for World Bank IPF Operations (Catalogue Number OPCS5.05-DIR.01) issued (Retrofitted) on February 4, 2015, and effective from March 1, 2010 and; World Bank Guidance: Reference Material-Financial Management in World Bank IPF Operations (Catalogue Number OPCS5.05- ID.02) issued and effective from February 24, 2015.

Project Financial Management Arrangements

16. FM supervision will start by assessing the progress of the project management unit staffing and reviewing the plan in place to execute disbursements following FM guidance. This supervision will take place before the contracts are awarded in case improvement measures need to take place before disbursement. The World Bank's FM supervision will also review quarterly progress and financial audits. Field-based FM specialists, in each country, will dedicate at least eight weeks per year to the project for implementation support.

17. **Budgeting arrangements**. The budgeting process will need to consider all relevant aspects of the project and be prepared at least two months before the beginning of the fiscal year to which it pertains. The Department of Social Energy (*Departamento de Energia Social*) at EDM, in close coordination with other relevant units of EDM, will prepare budget activities which will be captured in the annual work plans, which will need to be submitted to IDA for approval. The budget will be monitored through the unaudited quarterly financial reports, which will measure the actual performance against the targets for each period, through the integrated management tool for FM, Integrated Financial Management System (*Gestão Integrada de Administração e Finanças,* GIAF) an accounting software, which is already functional and has been used to prepare the latest annual accounts of EDM. ESCOM has adequate staffing capable of carrying out the FM activities of the project including budgeting, accounting and reporting, and will aggregate and segregate the project expenditures as part of its annual budget, derived from work plans and budget. Significant differences between the planned and actual expenditures will also need to be documented in the quarterly reports, which will be submitted to IDA within 45 days after the end of each calendar quarter. The principles and procedures for preparation of the consultative budget shall be included in the PIM, including their respective formats.

18. **Accounting arrangements.** The accounting transactions will be recorded and summarized in the GIAF accounting software for EDM, which will also be used to generate quarterly and annual reports. In addition to the accounting system to be installed and the books needed to maintain an accurate and complete record of transactions, EDM will need TA to ensure just-in-time country-based support for the GIAF to ensure continuity in the case of interruptions.

19. EDM's finance department is headed by an experienced director and accountants. EDM has been implementing several World Bank-financed operations over the last decade. EDM has also appointed an accountant who will be solely responsible for the activities of the project but will still work under the overall

responsibility of the director. The director's experience will play a key role in the transfer of know-how and providing training to all accountants.

20. The project will make use of International Public-Sector Accounting Standards and Cash Basis of accounting, which recognizes transactions and events only when cash (including cash equivalents) are received or paid by both the implementing agencies.

Internal Control Arrangements

21. **Internal control systems.** The assessment was favorably affected by the fact that EDM and ESCOM have been implementing World Bank-financed operations continuously for at least the past decade and they have generally performed well. However, the review of the payment process indicates that there are significant delays which could affect the timely implementation of activities. EDM and ESCOM will need to strengthen their payment cycle to ensure that the process is clear and transparent. These procedures will be documented in the PIM, which will be approved by the World Bank. A review of the project audit reports and internal systems and procedures did not reveal significant reportable issues. However, EDM continues to face challenges, particularly with regard to pension provisions and differences between commercial and financial systems, which are expected to be solved with the full implementation of the GIAF.

22. **Internal auditing**. EDM and ESCOM each have an internal audit department performing post-audit activities on all the financial transactions of the entity, including an assessment of whether the budget utilization is in line with the intended purposes. The central internal audit unit will assign its staff in ESCOM to be responsible for the internal activities of the project to strengthen systemic controls in the project. The internal auditors will follow up with the management to implement the audit recommendations as highlighted by the internal and external auditors. A clear segregation of duties for the processing of project expenditures will be documented in the PIM and also in the FM manual. At least annually, the internal audit department would be involved in conducting audits pertaining to this project and such reports will need to be shared with IDA. The internal audit function reports directly to the Chairman and Board of Directors for independence in the case of EDM.

Funds Flow and Disbursement Arrangements

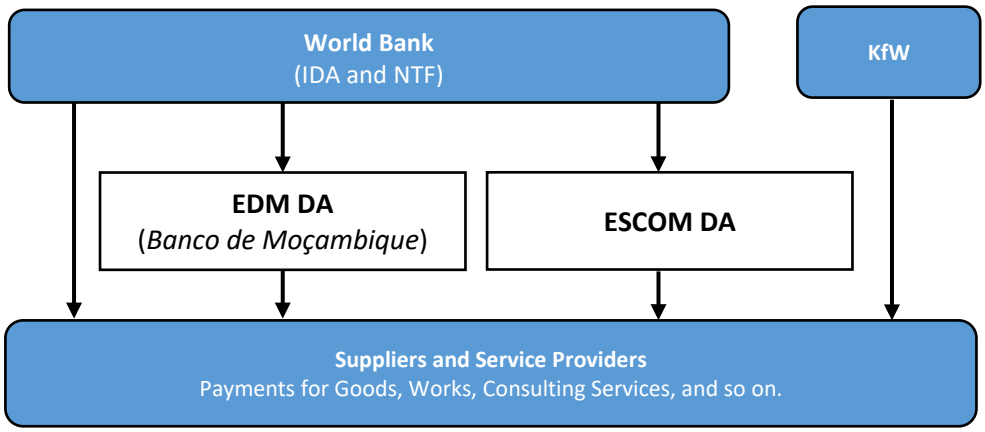
23. **Funds flow arrangements.** EDM and ESCOM will open separate DAs for the project in their respective countries, in U.S. dollar. Details of the DA and the Authorized Signatories Letter, in the format defined in the Disbursement Letter, should be submitted to the World Bank, soon after the Financing Agreement is signed, to ensure that there are no delays in the first disbursement.

24. All the implementing entities will submit an initial withdrawal application to the World Bank based on a six-month forecast, as stated in the Disbursement Letter, but also based on agreed project work plans and budget. For EDM, the arrangement is relatively simple with centralized payments at EDM allowing for more effective control of the project funds.

25. The funds flow arrangement according to the disbursement categories, will be aligned to the project components. The World Bank will disburse the proceeds of the credit to a U.S. dollar-denominated DA, to be opened in the Reserve Bank of Malawi and *Banco de Moçambique*, Mozambique or a commercial bank in each country, acceptable to the World Bank. For Malawi, the withdrawal applications will duly be signed by any of the authorized signatories in ESCOM/Ministry of Finance, Economic Planning and Development, and consistent with

the authorized signatory letter arrangements for the GoMA. A corresponding currency carrying account will be opened in the Reserve Bank of Malawi and Malawi kwacha-denominated operational accounts will be opened in commercial banks, acceptable to the World Bank. The U.S. dollar currency and the Malawi kwacha shall form the currency of transactions for financial accounting and reporting purposes. For Mozambique the withdrawal applications will be duly signed by the authorized signatories in EDM.

Figure 3.3. Fund Flow Arrangement for the Project



26. **Disbursement arrangements.** The implementing agencies will use report-based disbursement procedures mainly through the advance disbursement method. It may also use other methods of disbursement such as Direct Payments, Special Commitments, and Reimbursements. Details concerning disbursements are spelt out in the project's Disbursement and Financial Information Letter. In Mozambique, all payments to local individuals, entities and consultants will be made strictly in local currency in compliance with Mozambique rules and regulations.

Table 3.1. Eligible Expenditures under Mozambique IDA Grant

Category	Amount of the Grant Allocated (expressed in SDR)	Percentage of Expenditures to be Financed (inclusive of Taxes)
(1) Goods, works, non-consulting services and consulting services for Part 1.A of the project.	29,800,000	48%
(2) Goods, non-consulting services, consulting services, operating costs and training costs for Part 2.A of the project.	800,000	100%
TOTAL AMOUNT	**30,600,000**	

Table 3.2. Eligible Expenditures under Malawi IDA Credit

Category	Amount of the Credit Allocated (expressed in SDR)	Percentage of Expenditures to be Financed (inclusive of Taxes)
(1) Goods, works, non-consulting services and consulting services for Part 1.B of the project.	9,500,000	39%
(2) Goods, non-consulting services, consulting services, operating costs and training costs for Part 2.B of the project.	1,500,000	100%
TOTAL AMOUNT	**11,000,000**	

27. **Financial reporting arrangements.** EDM and ESCOM will prepare quarterly unaudited interim financial reports (IFRs) in form and content satisfactory to the World Bank, which will be submitted to the World Bank within 45 days after the end of each calendar quarter to which they relate. To simplify arrangements, the format of the reports will be similar to those used under the recently closed projects. Details of the reporting requirements, including content, format, and frequency will be defined in the PIM. These reports will include (a) DA activity statement; (b) summary payments subject to the World Bank's prior review; (c) summary payments not subject to prior review; (d) detailed use of funds by project components/activity; (e) explanation of variances and short-term forecasts of expenditures; and (f) list of contracts and commitments. The IFR template has been agreed during the negotiations between the Governments and the World Bank.

28. **Auditing arrangements.** Annual audited financial statements with the respective Management Letter will be submitted by EDM and ESCOM to the World Bank within six months of the end of the fiscal year being audited. The audit reports will be publicly disclosed on the World Bank's external website and the audits will be conducted in accordance with International Standards on Auditing. Submission of audited financial statements as well as interim unaudited financial statements are included as legal covenants under the proposed project. The audits will include appropriate disclosure of the project activities as follows:

- A statement of sources and uses of funds showing funds.
- A summary of expenditures analyzed by both component and category.
- The supporting notes with respect to significant accounting policies and accounting standards adopted by management.
- Summary listing of withdrawal applications by reference number, date, and amount.

29. **Implementation support plan.** The World Bank's project team will closely monitor FM activities to identify, in advance, potential delays in the preparation of the financial and audit reports and undertake corrective measures. The project's financial statements will be audited by an external auditor hired under the project under terms of reference acceptable to the World Bank. Consistent with the risk rating an annual FM implementation support mission will be carried at the project. The FM supervision missions' objectives will include reviewing the adequacy of the FM systems maintained for the project at EDM and ESCOM.

Table 3.3. Table of Audit Compliance Requirements

Action	*Periodicity*	*By Whom*
Submit audit report within 6 months of end of fiscal year	Annually	EDM and ESCOM

30. **FM action plan.** As stated, the project's FM arrangements meet the World Bank's minimum requirements under IPF Policy. Given its residual risk rating, the project will require on-field implementation support missions at least twice a year. The FM action plan below outlines the mitigating measures which, if implemented, would strengthen the FM arrangements.

Table 3.4.FM Action Plan

	Action	*Date Due*	*Responsible Entity*
1	Appointment of accountant	By effectiveness	EDM and ESCOM
2	Completion of customization/addition of project to the GIAF	Within three months of effectiveness	EDM
3	Hiring of an independent Auditor	Within three months of effectiveness	EDM and ESCOM

Procurement

31. **Procurement procedures.** Procurement activities under the proposed project will be carried out in accordance with 'The World Bank's Procurement Regulations for IPF Borrowers' (Procurement Regulations), dated July 2016 and revised in November 2017 and August 2018; and the 'Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants', dated July 1, 2016; and the provisions stipulated in the Financing Agreement.

32. **Systematic Tracking of Exchanges in Procurement (STEP).** The World Bank's system will be used to prepare, clear, and update Procurement Plans and conduct all procurement transactions for the project. As part of the preparation, staff from EDM and ESCOM have already attended STEP training. Other procurement staff will be trained in STEP.

33. **National procurement procedures.** National open competitive procurement procedures may be used while approaching the national market. National open competitive procurement will observe the requirements stipulated in the Procurement Regulations on National Procurement Procedures. Other national procurement arrangements (other than national open competitive procurement), which may be applied by the Borrowers (such as limited/restricted competitive bidding, request for quotations/shopping, and direct selection), shall be consistent with the World Bank's Core Procurement Principles and ensure that the World Bank's Anti-Corruption Guidelines and Sanctions Framework and contractual remedies set out in the Financing Agreements apply.

34. However, 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 Anti-Corruption Guidelines, including without limitation the World Bank's right to sanction and the World Bank's inspection and audit rights, and that the procurement documents include provisions, as agreed with the World Bank, intended to adequately mitigate against environmental, social (including SEA and GBV), and health and safety risks and impacts.

35. **Procurement templates.** The World Bank's Standard Procurement Documents (SPDs) shall be used for procurement of goods, works, and non-consulting services under International Competitive Procurement. National bidding documents may be used under National Procurement Procedures subject to the exceptions stipulated in the textual part of the Procurement Plan. Similarly, selection of consultant firms shall use the World Bank's SPDs, in line with procedures described in the Procurement Regulations.

36. **Fiduciary oversight by the World Bank.** The World Bank shall prior review contracts as provided in the Procurement Plan. All contracts not covered under prior review by the World Bank shall be subject to post review during implementation support missions and/or special post review missions, including missions by consultants hired by the World Bank.

37. **Frequency of procurement supervision.** In addition to the prior review supervision to be carried out from World Bank offices, the capacity assessment of the implementing agencies recommends one supervision mission every 12 months to visit the field to carry out post review of procurement actions.

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

39. **Summary of the PPSD.** The summary of the PPSD is as follows:

A. Summary of the Proposed Procurement Contracts.

The main contracts to be undertaken under the project will include the following:

(a) Consulting services for owner's engineer (supervision engineer) for both Malawi and Mozambique EPC contracts.
(b) Construction in Mozambique of a 400 kV overhead transmission line from Matambo 400 kV Substation to the border between Mozambique and Malawi.
(c) Construction in Mozambique of a new 220/400 kV, 500 MVA Substation and extension of the existing 220 kV substation, in Matambo, in Tete Province.
(d) Construction in Malawi of a 400 kV overhead transmission line from the border between Mozambique and Malawi to Phombeya 400 kV Substation and extension of Phombeya 400 kV Substation.

B. Malawi Capacity and PIU Assessment.

40. Project implementation will be led by the same team that started the implementation of the feasibility study and ESIAs. Key staff, including the project manager, procurement specialist, FM specialist, and other team members are available to support the project. The other team members are drawn from a pool of experts who have been involved in similar projects that were recently completed (World Bank ESSP and MCC Compact). However, the PIU will need TA for procurement and contract management. The support for procurement shall be provided by the Tender Agent**,** who has already been engaged using the NTF.

41. The overall project procurement risk is Substantial. Table 3.5 details the risks that have been identified under the project and mitigation measures that have been proposed.

Table 3.5. Malawi Procurement Related Risks

	Risk	Risk type	Mitigation Measure	Time Frame	Responsibility
1	Possibility of no simultaneous completion of the transmission line and the substation to make the facility available for use	Substantial	The entire transmission line and the substation on the Malawi side are under one procurement and will be awarded to a single contractor under two contracts. The timing of the procurement process of the substation on the Mozambique side would be such that it gets completed more or less at the same time as the transmission line.	Continuously since procurement planning	EDM/ ESCOM
2	Coordination between ESCOM and EDM in decision making for procurement and contract management	High	Necessary coordination mechanism shall be framed jointly by EDM/ESCOM with assurance that the same shall consistently followed	Done	EDM/ ESCOM
3	Risk of not conducting procurement process correctly following World Bank Regulations	Substantial	Engagement of a Tender Agent to support the two implementing agencies.	Done	ESCOM/EDM
4	Contract management capacity	Substantial	Engagement of an Owner's Engineer to carry out supervision of EPC contracts	Selection process started and shall be completed before signing of EPC contracts	ESCOM/EDM
5	Inefficient complaint redressal	Moderate	To ensure prompt action on the complaints following the country and World Bank procedures.	Regular	ESCOM
6	Staff handling procurement leaving the project/transferred	Substantial	ESCOM to ensure that trained staff are retained under the project	Whole life time of project	ESCOM
7	Record keeping and documentation	Moderate	ESCOM to ensure maintaining all procurement records timely and properly. The tender agent shall ensure this.	Regular	ESCOM

C. Mozambique Capacity and PIU Assessment

42. Project implementation will be led by the same team that started the implementation of the feasibility study, ESIAs and RPFs.

43. The EDM PIU is led by a project director and is supplemented with additional staff given the size of the project portfolio it manages. The director will be supported by a limited number of dedicated technical supportive staff including specialized technical staff from other departments of EDM. The project director has extensive experience in project management and procurement based on the National Procurement Legislation, World Bank, and KfW Procurement Guidelines and have already completed implementation of important and complex projects mostly funded by the World Bank, the Norwegian Government, and KfW including from other regional financial development institutions. In addition, the project will be supported by a tender agent to carry out procurement of the EPC contractor and an owner's engineer to conduct contract supervision of the EPC Contracts.

44. The overall project procurement risk is Substantial. Table 3.6 details the procurement-related risks that have been identified under the project and the mitigation measures that have been proposed.

Table 3.6. Mozambique Procurement-Related Risks

	Risk	Risk Type	Mitigation measure	Time frame	Responsibility
1	Possibility of no simultaneous completion of the TL and the substation to make the facility available for use	Substantial	The entire transmission line and the substation on the Malawi side is under one procurement and will be awarded to a single contractor under two contracts. The timing of the procurement process of the Substation on the Mozambique side would be such that it gets completed more or less at the same time as the transmission line.	Continuously since procurement planning	EDM/ ESCOM
2	Coordination between ESCOM and EDM in decision making for procurement and contract management	High	Necessary coordination mechanism shall be framed jointly by EDM/ESCOM with assurance that the same shall be religiously followed	Done	EDM/ ESCOM
3	Risk of not conducting the procurement process correctly following World	Substantial	Engagement of a Tender Agent to support the implementing agencies.	Done	ESCOM/EDM

	Risk	Risk Type	Mitigation measure	Time frame	Responsibility
	Bank Regulations				
4	Contract management capacity	Substantial	Engagement of an owner's engineer to carry out supervision of EPC contracts	Selection process started and shall be completed before signing of EPC contracts	ESCOM/EDM
5	Delays in procurement approval process: the procurement approval process in Mozambique is very lengthy. EDM as a public institution has to follow the Governmental approval process which is takes several steps.	Substantial	EDM to closely monitor the approval process to avoid delays.	Whole life time of project	EDM
6	Record keeping and documentation	Moderate	EDM to ensure maintaining all procurement records timely and properly. The tender agent shall ensure this.	Regular	EDM

D. Market Research and Analysis

45. The main procurement activities under the project are recruitment of Owner's Engineer and engagement of a contractor for the detailed design, supply, and installation of the transmission line and related substations to interconnect Malawi and Mozambique.

46. Drawing from the previous ESSP, MCC Project and other procurements conducted by ESCOM, and Energy Reform and Access Program, Energy Development and Access Program, and PERIP, and other procurements conducted by EDM, the market has demonstrated that it is ready for procurements along the lines of the Mozambique-Malawi Regional Interconnector Project. Based on the EPC contracts under these projects, the market indication is that there are existing and potential bidders that can avail themselves of the global market to participate and offer competitive prices.

E. Procurement Arrangements

47. Based on the risks identified above the following procurement arrangements are proposed:

(a) Approach to market. Based on the size of the contracts under this project, open international bidding will be followed; however, generally, the thresholds shown in table 3.7 will be used for open national/ international and Request for Quotation bidding under this project.

Table 3.7. Thresholds for Procurement Approaches and Methods (US$, millions)

Category	Works			Goods, Information Technology, and Non-Consulting Services			Shortlist of National Consultants	
Market Approach and Methods	Open International ≥	Open National <	Request for Quotation ≤	Open International ≥	Open National <	Request for Quotation ≤	Consulting Services ≤	Engineering and Construction Supervision ≤
Malawi	7	7	0.2	1	1	0.1	0.2	0.3
Mozambique	15	15	0.2	3	3	0.1	0.3	0.3

(b) Selection method. The procurement of goods, works, and selection of consultants shall follow procedures and methods as stipulated in the Procurement Regulation for IPF Borrowers dated July 2016, revised November 2017 and August 2018, and the Procurement Plan.

(c) Contract strategy. The contracts have been proposed to be packaged and procured as follows:

A. **Owner's Engineer** (supervision consultant) for both Malawi and Mozambique contracts. This shall follow open-international approach using the Quality and Cost-Based Selection method, and two separate contracts shall be signed by the respective countries.

B. **EPC contracts.** There shall be two separate packages following open international bidding using the World Bank supply and installation SPD.

- **Package 1** consists of construction of 218 km, 400 kV transmission line which includes optical power ground wire, comprising the following two separate sections to be procured under the same procurement process and implemented under two separate contracts (with provision of the cross-fall breach clause):
  - 142 km of length related to the Mozambican side, from Matambo Substation, in Tete, to the border with Malawi, as Section 1, under a contract to be signed in Mozambique.
  - 76 km of length, related to the Malawian side, from the border with Mozambique to Phombeya Substation, in Balaka including construction of the landing bay at 400 kV Phombeya Substation, as Section 2, under a contract to be signed in Malawi.

- **Package 2** consists of (a) a new 400/220/33 kV, 500 MVA substation in Matambo; and (b) extension/upgrade of the Matambo substation related to the Mozambican side from 220 to 400 kV, under another separate procurement process and implemented under one separate contract.

(d) Financing arrangement of the contract. The procurement document will indicate that the contract shall be financed by the World Bank and KfW, in a certain percentage, to be indicated at the time of precontract discussions.

(e) Procurement policy and procedure and the review process of the procurement transactions: It has been agreed with KfW that the World Bank's policy and procedures (including eligibility criteria) shall apply for all the procurements under the project. The World Bank will provide the no-objection to the transactions as needed as per the procedure. However, for the bidding document and RFP, KfW will also review the documents simultaneously with the World Bank and provide comments to the World Bank. The other documents shall be shared with KfW only for their information.

(f) Procurement Plan. The recipients have developed a joint Procurement Plan for the first 18 months of project implementation. This plan was agreed between the recipients and the World Bank during Appraisal, which contains major contracts to be signed by project effectiveness. The plan will be made available at the project's database and on the World Bank's external website after the proposed grant and credit approval. The Procurement Plan will be updated annually, or as required, to reflect the actual project implementation needs and improvements in institutional capacity.

(g) Beneficial ownership declaration requirement. The project procurement is likely to involve procurements within Operations Procurement Review Committee (OPRC) thresholds; hence, beneficial ownership declaration shall be applicable. In such procurements, before a contract is signed, the winning bidder will be required to complete a standard template identifying beneficial owners, which are those individuals with a controlling interest in the company. In this respect suitable provision shall be provided in the bidding document. Borrowers will be required to publish beneficial ownership information, together with other contract award information, on their websites, and the World Bank's external website. This information will not be routinely verified by the Borrower or the World Bank. However, the World Bank may conduct verification when triggered by integrity red flags, or in other cases when extended due diligence is warranted.

F. Contract Management

48. Under the project all the three EPC contracts have been identified to be complex and therefore, a mandatory Contract Management Plan will be put in place for them.

Environmental and Social (including safeguards)

49. The project is in Category A for environmental assessment. The length of the transmission line in Component 1 is not unusual in the region. The line is routed away from protected areas and other important habitats - it does not pass through a wildlife migration corridor, and the amount of land to be acquired for its wayleave is not excessive. There are two ESIAs for the project. The first ESIA was prepared by an international consultant and issued in 2010 for the entire line with a slightly different line route. The World Bank safeguards policies were taken into account in its preparation. The ESIA was updated by another international consultant in

2017, under the supervision of EDM and ESCOM to reflect changes in baseline conditions since 2010. The World Bank safeguards policies triggered for the project and taken into account in the ESIAs are OP/BP 4.01-Environmental Assessment, OP/BP 4.04-Natural Habitats, OP/BP-4.11 Physical Cultural Resources, and OP/BP 4.12-Involuntary Resettlement.

50. Apart from temporary impacts during construction, such as noise, dust, pollution from oil and fuel spills and construction camp wastes, gender aspects and vulnerable groups, labor influx and presence of foreign workers, and potential social conflict between 'foreign' workers and local communities, the ESIAs list the main adverse impacts of Component 1 such as bird and bat collisions with conductors, loss of vegetation cover that is habitat for small animals, fragmentation of habitat, disturbance of migrating animals, transmission of HIV/AIDS and other communicable diseases, and impairment of agriculture-based livelihoods. The RPF indicates that there is physical or economic displacement of approximately 2,123 individuals to provide for the ROW of the transmission line and a number of households will need to be fully relocated because 45 principal structures belonging to 34 households in Malawi and 40 principal structures belonging to different households in Mozambique are located in the ROW. The RPF also notes that that there are migrant PAPs in each national jurisdiction. Component 2 comprises capacity building.

51. The project is not expected to cause conversion or degradation of any critical natural habitat, and much of the land that will be acquired for the wayleave is modified habitat. Direct impacts on natural habitat (mostly bush, scrub, shrubland and grassland) can be mitigated through selective clearing. The proposed alignment does not pass through any protected areas in Mozambique. Cumulative impacts on the protected areas are possible and will be assessed in parallel with the final design. Mitigation measures are required in the ESMPs for those impacts and for potential loss of biodiversity, bird collisions and disturbance of wildlife movement, for which a Wildlife Management Plan will be prepared before start of construction. Village graveyards are present within the proposed transmission line corridor, and the graveyards that cannot be avoided will need to be relocated in accordance with OP/BP 4.12 and the applicable Malawian and Mozambican law. The proposed alignment avoids archaeological sites. A chance finds procedure is included in the ESIAs and will be part of the construction contracts in case other physical cultural resources are discovered during line or substation construction.

52. The international project implementation consultant (Owner's Engineer), to be engaged by ESCOM and EDM for supervision and management of the project, will review the contractors' ESMPs and health and safety plans and advise the PIU regarding their approval. The consultant will be responsible for field supervision of the ESMP and health and safety plan implementation and will include a qualified specialist in its team for this purpose.

53. **Gender.** In Mozambique, female-headed households represent 36 percent of all households and are more likely to fall below the poverty line than male-headed households.[45] In 2015, the incidence of poverty in female-headed households was 57.8 percent when compared to 53.9 percent of male-headed households.[46] Rural female-headed households are the most marginalized and excluded, with lack of secure rights to housing and other key resources. Furthermore, projects that require installation of substations and, high and medium voltage lines result in land displacement and resettlement; as a result, women often suffer more than men from the loss of household assets and social support networks. Economic changes including ancillary infrastructure, businesses and communications systems, and labor influx can disrupt women's traditional livelihoods. Therefore, large energy

[45] *Inquérito Demográfico e de Saúde* (2011)
[46] United Nations Economic Commission for Africa. Mozambique - Country Profile 2016

infrastructure projects have to integrate gender considerations to ensure minimal disruption in the livelihoods and accrual of social and economic benefits to those living within the construction areas.[47] At the utility level, in 2017, EDM conducted a general review about women's participation in operations. The results showed that women represented 17 percent of the work force at EDM and 25 percent of women worked in technical areas. One of the key programs that EDM relies on to attract new talent is their Young Professionals Program.

54. In Malawi, female-headed households constitute 26 percent of all households and only 7.6 percent of female-headed households have access to electricity in their dwelling units when compared to 12 percent of male-headed households. Most female household heads are widowed, separated or divorced, and carry a higher burden of caring for children and elders when compared to male-headed households. Further, many female-headed households are dependent on agricultural production for income, but due to increased climatic uncertainties, the lack of stable income contributes to persistent cycles of poverty. In 2016, 83.3 percent of female-headed households and 76.3 of male-headed households were engaged in agricultural production that involved land cultivation during the rainy season, and 78 percent of these households were in rural areas of Malawi. Further, a study done on Malawi resettlement showed that men used the large cash transactions for alcohol and luxury items while women used the cash to pay for school fees and improve the welfare of the children.[48]Due to the use and value of land to women, displacement, resettlement, livelihood loss, job creation, and benefit sharing from large energy projects can be unequal between men and women.[49]

55. The employment rate in Malawi is higher for men (78 percent) compared to 67 percent for women. In Malawi, approximately, 59 percent of working women are more likely to be unpaid as compared to 61 percent of men who are more likely to be paid in cash.[50] At the institutional level, only 10 percent of the ESCOM staff are female and the proportion of women in engineering and technical fields within ESCOM is even lesser (7 percent).

56. At the utility company level, the project build on and support the gender capacity programs being developed by EDM and ESCOM. In the case of ESCOM, the World Bank will support, through the preparation and implementation of a capacity-building plan and program, the design of a recruitment, mentoring, and leadership development program targeting potential, new, and existing female employees in engineering and technical fields at ESCOM. To advance women's participation in the workforce in Mozambique, EDM will initiate the following programs: (a) increased awareness among the next generation workforce of potential economic activities or jobs through the 'Bring your Daughter to Work' program; (b) outreach to high school level educational institutions to attract youth to careers relevant for EDM; (c) technical visits to power sector facilities (such as generation plants or substations) for women in EDM's workforce, to increase their understanding of the business; (d) increase of women's participation in management positions, through the introduction of gender targets in the competitive selection processes; (e) preferential hiring for technical positions recently advertised (for example, *Central Termica de Maputo*); and (f) creation of a young professionals program. This will enhance the female technical talent pool and contribute to the closure of the identified gender gaps. As part of the Market Operations Department, which will handle daily trading on the SAPP market and bilateral trading that will result from the

[47] ENERGIA International Network on Gender and Sustainable Energy and Norwegian Embassy -September 2011 "Building Capacity for Gender Mainstreaming of the Energy Sector in Mozambique – Gender and Energy Assessment (Authors: Dorothy Lele, Chandirekera Mutubuki-Makuyana, Dominos Neto, Joy Clancy, Sheila Oparaocha)

[48] www.wi-her.org

[49] ESMAP (Energy Sector Management Assistance Program). 2013. "Integrating Gender Considerations into Energy Operations." Knowledge Series 014/13 (http://www.esmap.org/sites/esmap.org/files/ESMAP_Interating_Gender_Into_Energy_Operations.pdf).

[50] Source: Malawi Demographic and Health Survey (DHS) 2015-16.

interconnector, a focus will be placed on certifying 4 female staff from ESCOM and EDM in market trading. Currently no women have this certification and skills profile in ESCOM and EDM indicating a gap in profile in this profession and sector.

57. Given the employment gaps and proposed initiatives outlined above, emphasis will be placed on tracking progress towards closing women's labor force participation rates. The project will monitor the progress at EDM to advance 30 percent of females hired under the Young Professional Program, percentage of female technical and engineering staff at ESCOM (Target 15 percent) and the number of female staff in EDM and ESCOM trained and certified in market trading activities as part of the project (Target 4). In addition, the development and implementation of a recruitment, leadership, and mentoring program targeting females in STEM fields at ESCOM will be tracked.

58. Because the project will include construction of high voltage transmission lines, it will likely lead to resettlement of households and agricultural land along the construction zone. Because of the higher proportion of female-headed households that are involved in cultivation of land for agricultural production and food security, the project will ensure that gender considerations are integrated throughout the project design in both Mozambique and Malawi. In order to ensure equitable compensation of land, the project will engage in gender-responsive consultations to reduce the negative impact of land resettlement and ensure a transparent process to make sure both male headed and female headed households have equal access to land, especially in rural areas. Other gender considerations will include awareness and educational campaigns on impact of the project and the content will include joint titling on newly-owned land from land compensation, property rights of women with respect to resettlement, and household budget training for husbands and wives if there is cash compensation, as well as income-generating opportunities available to women because of the project construction.

Project Implementation Manual

59. EDM and ESCOM will prepare a joint PIM for the project. The PIM will provide the detailed arrangements and procedures for implementation of the project, including (a) institutional coordination and day-to-day execution of the project; (b) budgeting, disbursement, and FM; (c) procurement; (d) environmental and social safeguard guidelines; (e) monitoring, evaluation, reporting, and communication; and (f) other administrative, financial, technical, and organizational arrangements required for the project.

60. The PIM prepared by the PIUs will be reviewed and cleared by the World Bank and KfW, thereby allowing for a smoother implementation of the project. The adoption of the PIM for Components 1 and 2 by the PIUs is a condition of effectiveness of the IDA Credit and Grant for the project.

Monitoring and Evaluation

61. The M&E of Components 1 and 2 will be performed jointly by the PIUs in EDM and ESCOM. For the investments proposed in Component 1, both ESCOM and EDM will require a dedicated staff member in the PIU to assist on all the M&E activities of the project. The PIUs, will be responsible for providing the required quarterly progress reports and elaborating an M&E manual as part of the PIM, which will guide the overall M&E activities. The progress reports will also be submitted to the World Bank including the results indicators (every quarter). Section VI presents the project's Results Framework, which defines specific outcomes and results to be monitored. Activities to be monitored include the timely and efficient construction and commissioning of the transmission line, quality control, and processing of payments to contractors approved by the Owner's Engineer, as well as effective implementation of the ESMPs and the RAPs of the project, and the successful completion of training activities.

62. Project-specific data will be collected by the two utilities. In addition, the World Bank will carry out the normal review procedures for procurement, regular supervision missions, FMRs, quarterly reports provided by the PIU, independent annual financial audits of the project, and financial statements of EDM and ESCOM. KfW and the World Bank have agreed on a single report format that they will use to monitor environmental and social impacts and track implementation of the ESMPs and RAPs.

Role of Partners

63. **The project will have two co-financing development partners: IDA and KfW.** In addition, financing will include an EU grant, and a Government of Germany grant, both administered by KfW for Component 1. IDA will finance both components. KfW (through the two grants) will provide co-financing in the amount of US$42 million for Component 1, to be disbursed as construction progresses in proportion to overall contribution for the component.

64. In addition, the NTF has supported the preparation of the proposed project with financing for feasibility studies, ESIAs, RPFs, operational costs, capacity building, and administrative fees to the value of about US$6 million. The NTF is a single-donor trust fund administered by the World Bank. It was approved in September 2009 with the aim of supporting IDA-financed regional power infrastructure projects in Southern Africa, in particular for projects in Mozambique. The activities financed are considered part of the project and the additional amount is US$24 million allocated to Component 1A of the proposed project.

65. For successful implementation of project aspects related to capacity building for regional integration and trade, the engagement and support from the SAPP experts and specialists from other operational power pools will be required.

ANNEX 4: Implementation Support Plan

COUNTRY: Africa
Mozambique - Malawi Regional Interconnector Project

Strategy and Approach for Implementation Support

1. Implementation support will include the provision of capacity strengthening in procurement, FM, safeguards, and governance, and anticorruption. An annual fiduciary review will be conducted for the project. Adequate budget will need to be allocated for this review. This review will be supplemented by on-site visits done by the World Bank's fiduciary staff at least once a year. Reliance will also be placed on the annual audit reports produced by the external auditors. In addition, desk reviews will be done for audit, financial, procurement, and any other reports received during the financial year. In-depth reviews may also be commissioned by the World Bank, whenever deemed necessary.

Implementation Support Plan and Resource Requirements

2. The proposed implementation plan is consistent under the responsibility of EDM and ESCOM, with targeted and continuous implementation support and technical advice from the World Bank and development partners.

3. The World Bank's implementation support will broadly consist of the following:

- Capacity-building activities to strengthen the national and local levels' ability to implement the project, covering the technical, fiduciary, and social and environmental dimensions
- Provision of technical advice and implementation support geared to the attainment of the PDO
- Ongoing monitoring of implementation progress, including regularly reviewing key outcome and intermediate indicators and identification of bottlenecks
- Monitoring risks and identification of corresponding mitigation measures
- Impact evaluation activities
- Close coordination with other donors and DPs to leverage resources, ensure coordination of efforts, and avoid duplication

Table 4.1. Project Implementation Support Plan

Time	Focus	Skills Needed	Resource Estimate	Partner Role
First six months	• Supervision and technical review of procurement • Implementation of environmental and social safeguards • Technical review, FM/procurement systems	Technical, fiduciary, environment, and social	US$200,000	KfW will jointly review and clear terms of references for Component 1.
Six (6)-48 months	• Implementation monitoring of works • Technical advice to support program implementation • Implementation of environmental and social safeguards • Monitoring and support for capacity building needs	Technical, fiduciary, environment, and social	US$400,000	KfW will jointly review and clear terms of references for Component 1
Midterm Review	Implementation progress review and identification of necessary midcourse adjustments	Technical (including M&E), fiduciary, environment, social, and operational	US$75,000	KfW provides inputs on lessons learned
48–72 months	• Implementation monitoring • Technical advice to support program implementation	Technical, fiduciary, environment, and social	US$320,000	KfW joint monitoring

Table 4.2. Project Skills Set and Allocated Time

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Project management (task team leader)	Ongoing	15	--
Project management (co-task team leader)	Ongoing	15	--
Technical specialists/team members (power, engineer, economist, power markets)	30	12	--
FM specialist	12	--	In Maputo and Lilongwe
Procurement specialist	12	--	In Maputo and Lilongwe
Environmental specialist	12	6	In Maputo and Lilongwe
Social specialist	12	6	In Maputo and Lilongwe
Administrative support	Ongoing	--	In Maputo and Lilongwe

Table 4.3. Project Partners

Partners		
Name	**Institution/Country**	**Role**
KfW Development Bank	Development Partner/Germany	Co-financier

ANNEX 5: Economic and Financial Analysis

COUNTRY: Africa
Mozambique - Malawi Regional Interconnector Project

Rationale for Public Sector Provision/Financing

1. Traditionally in Africa, transmission lines (both national and regional) are perceived as natural monopolies and financed by the public sector. That is the case for most of the regional interconnectors in the SAPP and other African power pools such as EAPP and WAPP. So far, private sector participation has been largely confined to generation sub-sector, even though countries in the region are exploring public-private partnerships to finance transmission lines. The appetite from the private sector is still limited due to low perceived returns and high risks. These characteristics including political risk, market risk, off-taker creditworthiness risk, do exist for this proposed project.

2. The policy framework for private sector participation in energy projects in Malawi is nascent. The new Energy Policy 2018 has been approved by the cabinet, while the IPP framework, the renewable energy strategy, and others have been approved by MONREM. These policies, strategy notes, and guidelines are yet to be tested in the private capital markets and their implementation for the specific case of transmission assets will take time to materialize in both countries. Considering the urgency of this project to mitigate the negative economic effects of lost load in Malawi, public sector financing largely supported by concessional finance from the donor community appears to be the only realistic option for financing the proposed project on a priority basis.

Value Added of Bank's Support

3. The World Bank's deep involvement across countries in the SAPP region (through the IDA-funded SAPP AREP Program [P126661]) has contributed to rationalizing and coordinating various inter-linked power trade initiatives in the area. The World Bank is uniquely positioned in both Mozambique and Malawi to support stakeholders in overcoming implementation challenges by leveraging the experience it has in developing regional projects associated with power pools such as the SAPP and WAPP in Africa. While the World Bank has traditionally engaged on energy issues in this region at a country level, regional initiatives including the Great Lakes and Sahel initiatives as well as recent experience with WAPP suggest that a holistic regional approach to key development issues can help bring the right scale of resources and international attention to bear on the issue and can offer the most efficient overall solution.

4. Structuring large energy projects to achieve financial closure and lead to successful operation requires a complex set of skills that are not easily available in most SAPP countries. The World Bank's participation during the early stages in coordination between the two countries (as a neutral party/honest broker) has been key for the project preparation to move forward in a timely manner. The World Bank has and will continue to provide the required TA to both utilities to ensure adequate implementation of the project based on the World Bank's expertise acquired from similar projects in the Africa region. Sustained capacity building within the utilities is a condition for reaching the performance targets established in the project.

Mozambique-Malawi Regional Interconnector Project - Economic Analysis

Description of the Project's development impact in terms of expected benefits and costs

5. The project offers the scope to improve the allocation of existing supply and generation capacities in the context of rising demand, increasing access agenda, and insufficient investment in the region. The project will not only put in place the physical infrastructure to connect Malawi to SAPP but will also yield valuable experience in cross-border power trading and set out institutional and commercial mechanisms to foster further development of the regional market.

6. Interconnection and power trade can help increase reliability of supply and enable member states to deal with power supply shocks at lower cost than through short-term emergency generation and support the development of electricity access projects in both countries. Malawi is consistently facing high cost of emergency generation and power shortages during the dry season due to low water levels in Lake Malawi and in the Shire River. In both cases transmission constraints, lack of an interconnection for Malawi has limited Malawi's access to regional trade options, which could have improved reliability at lower cost than the emergency options that had to be adopted.

7. The proposed project will enable Malawi to diversify its energy sources through connection into Matambo (Mozambique), a major substation in the SAPP system. The proposed project will also strengthen the capacity of the national utility ESCOM to improve its power delivery performance in a sustained manner. The project will enable Mozambique to enlarge the market for exports of its electricity, securing external revenues which, in part, will contribute to further support Mozambique's electrification efforts as presented in the NES. A follow-on phase not currently part of the project but potentially part of future IDA support would be enabled by this project. It would help provide reliable electricity to the northern part of Mozambique, which is characterized by scarcity of resources. Furthermore, the TA component will strengthen EDM's and ESCOM's position in the regional market.

8. The proposed project is a least-cost option identified in the recently adopted World Bank-financed IRP for Malawi, based on the projected demand and factors such as (a) the proposed commissioning dates for priority generation projects which have been recommended by the IRP; (b) water supply for the hydro plants; (c) measures of present value (total cost, capital costs, fuel costs, and average annual costs); and (d) economic impact, social acceptability, security of supply, and overall efficiency. The IRP study relied on the resource assessment of supply-demand scenarios from which a least-cost optimization of the respective scenarios was done. The IRP included results from a demand forecast (using top-down approach), which is followed by a supply-demand resource assessment. The project's economic viability is estimated on power flows of energy through the transmission interconnection: into Malawi from Mozambique during the initial years of operation.

Methodology for the Economic Analysis

9. The economic and financial analysis was carried out assuming the development of Circuit 1 only, expected to be operational in 2022. The second circuit of the interconnector is expected to be commissioned a few years later but it is not included in the scope of this project.

10. The economic analysis of the project was developed following the standard cost-benefit analysis to determine the net economic benefit of the proposed project. The economic costs of the project were compared with benefits over the first 10 years of operation (2022 - 2031). Economic cash flows were discounted at 6 percent discount rate (following the implementation of the World Bank Guidance to estimate discount rates for economic analysis).

11. The incremental costs and benefits of the cross-border transmission project proposal were estimated by comparing the 'with project' and the 'without project' scenarios. Under the 'without project scenario' (base case), it is assumed that the equivalent amount of energy considering the additional capacity from the interconnector is generated in Malawi by emergency rental power plants (avoided cost principle), following similar experience in the previous years.

12. The project's economic costs include all investment costs (converted from financial to economic costs) estimated to be incurred during construction period as well as the subsequent O&M costs of the transmission line and substations.

13. Project benefits were estimated following a conservative approach using an avoided cost methodology and were derived from the transmission of incremental energy over the 400 kV transmission line. In particular, the computing of economic benefits is based on the replacement of expensive emergency rental power plants to face power demand increase in Malawi. The GoMA, through ESCOM, is currently procuring 78 MW of emergency rental power to address critical power shortage in the medium term.

14. The analysis also includes a quantification of the project's impact in terms of carbon emission both in metric units and in monetary terms, however, no other relevant environmental and social externalities were quantified.

Demand-Supply scenario in Malawi

15. Demand forecasts are based on data from ESCOM, IRP and on the recent Malawi: Short-Term Power Adequacy Analysis developed by the World Bank. Energy demand represents the constrained scenario for the economic analysis: as Malawi's expansion plans do not go beyond 2031 and Mozambique's plan ends in 2026, power consumption is projected to grow at a compound rate of 15 percent over 2019 - 2031. This projection is consistent with ESCOM's most recent guidelines and GoMA's electrification targets, which aims at reaching 90,000 new connections on a yearly basis over the analyzed period and 30 percent of energy access by 2030.

16. Similar to power demand forecasts, the power supply scenario necessary to estimate the current and projected level of unserved energy in Malawi, follows the delay expansion scenario of the recent Malawi: Short Term Power Adequacy Analysis prepared by the World Bank. Power imports from Mozambique are expected to be the most feasible least-cost way of overcoming existing power shortages in Malawi; moreover, in the longer run (after 2025), it is assumed that the largest hydropower plants in the IRP pipeline are delayed by 1 - 2 years compared to Government indications.

Project Costs

17. The capital costs were spread over the second and the third year of the project's life span, at a rate of 60 percent for year 2 and 40 percent for year 3, assuming that the transmission line becomes operational in 2022. The capacity utilization of the transmission lines was assumed to be 80 percent in estimating the quantity of power transmitted. The total CAPEX for the project (Circuit 1 only) totals US$127.2 million (exclusive of taxes and physical contingencies). The O&M activities are estimated as 2 percent of the capital costs. Generation costs estimated at US¢8.5 per kWh, closely linked to the thermal generation costs in Mozambique, represent the marginal generation technology.

Project Benefits

18. The main economic benefit from the project is related to the incremental electricity available for Malawi after the commissioning of Circuit 1 of the interconnector that reduces the amount of unserved energy in the country. Power imports during the first five years after commissioning follow the commercially agreed firm capacity (50 MW) which represents around 263 GWh per year over 2022 - 2026, assuming a 60 percent capacity factor for the line. Import capacity is assumed to increase to 150 MW from 2027 by 2031 as additional generation capacity is developed in Mozambique; consequently, the interconnector is projected to increase its trading volumes, thus reaching a capacity factor of 80 percent and approximately 1 TWh of energy imported per year.

19. The economic benefits are then estimated as the forecasted reduction in unserved electricity demand in Malawi, valued conservatively at the avoided generation cost. This avoided cost is estimated based on the following assumptions:

a. Short run (2022 - 2025): Emergency rental generation estimated at US$270 per MWh.

b. Long run (from 2026 onwards): The avoided cost progressively reduces from US$270 per MWh in 2026 to US$100 per MWh in 2029 to reflect a convergence of emergency generation costs towards the long-run marginal cost of the system.

Results

20. The economic analysis shows that the proposed project is economically robust, given that power shortages in Malawi are acute. Based on these assumptions, the project yields an EIRR of 18.2 percent, excluding environmental benefits, and a baseline NPV of US$77 million (at 6 percent discount rate).

Table 5.1. Main Ratios from Economic Analysis

Ratio	**Unit**	**Value**
Discount rate	%	6%
EIRR (excluding CO_2)	%	18.2%
EIRR (including CO_2)	*%*	*21.0%*
Composition of NPV		
Costs		
CAPEX	US$ million	111
OPEX	US$ million	251
Total costs	**US$ million**	**361**
Total benefits - Reduction in Unserved Energy for Malawi	**US$ million**	**438**
NPV (excluding CO_2)	**US$ million**	**77**
Environmental benefits	*US$ million*	*30*
NPV (including CO_2)	*US$ million*	*107*

Sensitivity Analysis

21. A sensitivity analysis, in the form of switch values, was developed to test the robustness of the economic analysis to changes in key value drivers. Scenarios shown in table 5.2 were considered.

Table 5.2. Sensitivity Analysis Scenarios

Scenario	**Base Case**	**Sensitivity**	**Comment**
Reduction in avoided costs	x1	x0.82	An 18 percent decrease in the avoided cost of electricity during the lifetime of the analysis would be required for EIRR breakeven.
Reduction in unserved energy	x1	x0.62	A 38 percent decrease in the unserved energy reduced by the project would be required for EIRR breakeven.
Investment Costs (CAPEX)	x1	x1.7	A 70 percent increase in the investment costs would be required for EIRR breakeven.

Table 5.3: Economic Cash Flow Analysis of the Project

ECONOMIC ANALYSIS - MOZ-MAL INTERCONNECTOR	Unit	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Power Demand - Base Case	GWh	1,500	1,907	2,364	2,834	3,318	3,822	4,409	5,034	5,699	6,408	7,164	7,594	8,050
Without Project														
Domestic power generation	GWh/year	2,025	2,147	2,375	2,674	3,016	3,850	4,375	5,523	5,523	5,523	6,283	6,362	6,796
Import from existing lines	GWh/year	142	142	142	514	514	514	514	514	514	514	514	514	514
Total Power Supply - Malawi	*GWh/year*	*2,167*	*2,289*	*2,517*	*3,189*	*3,530*	*4,364*	*4,890*	*6,037*	*6,037*	*6,037*	*6,798*	*6,876*	*7,310*
Total Power Supply - Malawi (Net of Losses)	*GWh/year*	*1,807*	*1,909*	*2,099*	*2,660*	*2,945*	*3,640*	*4,079*	*5,036*	*5,036*	*5,036*	*5,670*	*5,736*	*6,098*
Unserved Energy - Without Project	**GWh/year**	**0**	**0**	**265**	**175**	**374**	**181**	**330**	**0**	**664**	**1,373**	**1,494**	**1,858**	**1,952**
With Project														
Domestic power generation	GWh/year	2,025	2,147	2,375	2,674	3,016	3,850	4,375	5,523	5,523	5,523	6,283	6,362	6,796
Import from existing lines	GWh/year	142	142	142	514	514	514	514	514	514	514	514	514	514
Additional energy from Moz-Mal interconnector	GWh/year	0	0	0	263	263	263	263	263	1,051	1,051	1,051	1,051	1,051
Total Power Supply - Malawi	*GWh/year*	*2,167*	*2,289*	*2,517*	*3,451*	*3,793*	*4,627*	*5,152*	*6,300*	*7,088*	*7,088*	*7,849*	*7,928*	*8,361*
Total Power Supply - Malawi (Net of Losses)		*1,807*	*1,909*	*2,099*	*2,879*	*3,164*	*3,860*	*4,298*	*5,255*	*5,913*	*5,913*	*6,547*	*6,613*	*6,975*
Unserved Energy - With Project	**GWh/year**	**0**	**0**	**265**	**0**	**154**	**0**	**111**	**0**	**0**	**496**	**617**	**981**	**1,075**

BENEFITS		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Reduction in Unserved Energy	GWh/year	0	0	0	175	219	181	219	0	664	877	877	877	877
Reduction in Unserved Energy (Avoided Costs: cost of running diesel-fired emergency plants)	*US$ mill./year*	*0*	*0*	*0*	*47*	*59*	*49*	*59*	*0*	*133*	*132*	*88*	*88*	*88*
TOTAL BENEFITS	***US$ mil./year***	**0**	**0**	**0**	**47**	**59**	**49**	**59**	**0**	**133**	**132**	**88**	**88**	**88**

COSTS		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Generation costs	US$ mil.	-	-	-	14.8	18.6	15.4	18.6	-	56.4	74.5	74.5	74.5	74.5
Capex	US$ mil.	-	76.3	50.9	-	-	-	-	-	-	-	-	-	-
Total O&M Costs (Circuit 1)	US$ mil.	-	-	-	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
TOTAL COSTS	**US$ mil.**	**0.0**	**76.3**	**50.9**	**17.3**	**21.1**	**17.9**	**21.1**	**2.5**	**58.9**	**77.0**	**77.0**	**77.0**	**77.0**
NET ECONOMIC BENEFITS (excl. CO2)	US$ mil.	0.0	(76.3)	(50.9)	29.8	38.1	31.1	38.1	(2.5)	73.8	54.5	10.7	10.7	10.7

CARBON EMISSIONS		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
CO2 emission reductions	*CO2 tons*	-	-	-	*29,172*	*60,424*	*33,881*	*60,424*	*(93,031)*	*92,442*	*241,697*	*241,697*	*241,697*	*241,697*
Social value of CO2	*US$/tCO2*	39	40	41	42	43	44	45	46	47	48	49	50	51
NET BENEFITS (incl. CO2)	*US$ mil.*	0.0	(76.3)	(50.9)	31.1	40.7	32.6	40.8	(6.8)	78.2	66.1	22.5	22.7	23.0

Financial Analysis of the Project

22. The financial analysis of the proposed project was carried out in accordance with the feasibility study and based on the outcomes of Malawi power demand-supply scenario developed for the project's economic analysis. The approach includes the following steps: (a) it compares the revenues (wheeling charges only) of the Mozambique-Malawi interconnector to its costs (i.e. investment costs, and O&M costs) [51] and (b) it assesses the project over its entire life cycle based on the discounting technique.

23. The costs of the 400 kV transmission line as well as the revenues (wheeling charges only) are set up as cashflows over the entire lifetime of 25 years. To determine the financial profitability of the project, a project cash flow is calculated assuming the project is entirely financed using concessional credits (with 38 years maturity, six years grace period and 0.75 percent interest rate). The costs of the project comprise all costs incurred during the implementation and subsequent operation of the transmission line and the substations, such as investment costs and, O&M costs. This also includes environmental costs and resettlement costs. The analysis is made in nominal U.S dollars.

Parameters and Assumptions

24. The project's financial model factors in exclusively the entry into operations of Circuit 1 in 2021, as Circuit 2 is not being developed under this project. The overall investment cost comprises the following components: (a) construction of around 218 km 400 kV transmission line Matambo to Phombeya and (b) construction of Matambo substation and extension of Phombeya substation. The investment costs include material costs, civil works, works and erection, spare parts, factory acceptance tests, and transportation as well as physical and price contingencies and implementation consultancy costs. Income tax for FCF calculation was assumed to be 27.5 percent (as for publicly traded companies), while value added tax and other taxes which may become applicable in Mozambique and Malawi are not included. A working capital requirement was set at around three months of operating costs on a yearly basis. In addition, a cash reserve account was added to the working capital needs to ensure the project generates enough cash to support debt repayment.

25. The interconnector revenues are based on the following two identified sets of projections:

a. Export energy load flows from Mozambique to Malawi as presented in the economic analysis.

b. Wheeling charge estimated at US¢1.5 per kWh, adjusted on a yearly basis following the U.S inflation.

26. The project will be largely financed by concessional credits and equity contributions are estimated to be limited to finance the implementation of safeguard measures plus any additional cash reserve required to support the working capital needed for the normal operation of the project, including reserves for debt repayment. Therefore, the expected weighted average cost of capital (WACC) for the project is estimated to be in the order of 1.5 percent. The cost of equity was assumed to be 20 percent, while the cost of debt is assumed at 0.75 percent, as previously presented.

[51] Since the project financial analysis is based on revenues from the wheeling charges only, the cost of electricity sold through the interconnector is also excluded from the analysis.

Results

27. The main indicators to confirm the financial viability of the project are the internal rate of return (IRR) and the NPV. The IRR describes the return that the project yields over its entire life. It is the rate at which the NPV is equal to zero. The NPV is the difference between the present value of cash inflows and the present value of cash outflows.

28. The project is financially viable with an NPV of US$158 million (at 1.5 percent discount rate as WACC) with an IRR of 7.4 percent (equity IRR is 28 percent).

Sensitivity Analysis

29. A sensitivity analysis, in the form of switch values, was developed to test the robustness of the project to changes in key value drivers. Specific emphasis was developed to test the ability of the project to repay the concessional credits while maintaining a minimum 20 percent IRR to the equity. Scenarios shown in table 5.4 were considered.

Table 5.4. Sensitivity Scenarios for Financial Analysis of the Project

Scenario	Base Case	Sensitivity	Comment
Wheeled energy	150 MW at 80 percent load factor from 2027 onwards	103 MW at 80 percent load factor from 2027 onwards	A 32 percent decrease of electricity wheeled through the line would be required for IRR breakeven without affecting debt repayment.
Wheeling tariff inflation adjusted	US¢15 per kWh with yearly adjustment based on U.S inflation.	US¢15 per kWh without adjustment.	Even if the wheeling tariff remains at the estimated level over the entire lifetime of the project, the estimated equity IRR remains above the threshold level (21 percent), with no effects on debt repayment.
O&M costs	x1	x1.25	Increases in the O&M costs higher than 25 percent would create financial sustainability problem during the initial years of operation as EBITDA values would not be enough to support interest repayments during the grace period.

Table 5.5: Estimated Financial Flows of the Project

	Unit	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045
Electricity Load Flows	GWh/year	0	0	0	263	263	263	263	263	1,051	1,051	1,051	1,051	1,051	1,051	1,051	1,051	1,051	1,051	1,051	1,051	1,051	1,051	1,051	1,051	1,051	1,051	1,051
Wheeling Charge	US$/MWh	15.0	15.3	15.7	16.0	16.4	16.7	17.1	17.5	17.9	18.2	18.6	19.0	19.5	19.9	20.3	20.8	21.2	21.7	22.2	22.6	23.1	23.6	24.2	24.7	25.2	25.8	26.3
TOTAL REVENUES	**US$ mil.**	**0.0**	**0.0**	**0.0**	**4.2**	**4.3**	**4.4**	**4.5**	**4.6**	**18.8**	**19.2**	**19.6**	**20.0**	**20.5**	**20.9**	**21.4**	**21.8**	**22.3**	**22.8**	**23.3**	**23.8**	**24.3**	**24.9**	**25.4**	**26.0**	**26.5**	**27.1**	**27.7**
Total O&M costs	US$ mil.	0	0	0	(2.7)	(2.7)	(2.8)	(2.8)	(2.9)	(3.0)	(3.0)	(3.1)	(3.2)	(3.2)	(3.3)	(3.4)	(3.4)	(3.5)	(3.6)	(3.7)	(3.8)	(3.8)	(3.9)	(4.0)	(4.1)	(4.2)	(4.3)	(4.4)
TOTAL OPERATING COSTS	**US$ mil.**	**0.0**	**0.0**	**0.0**	**(2.7)**	**(2.7)**	**(2.8)**	**(2.8)**	**(2.9)**	**(3.0)**	**(3.0)**	**(3.1)**	**(3.2)**	**(3.2)**	**(3.3)**	**(3.4)**	**(3.4)**	**(3.5)**	**(3.6)**	**(3.7)**	**(3.8)**	**(3.8)**	**(3.9)**	**(4.0)**	**(4.1)**	**(4.2)**	**(4.3)**	**(4.4)**
EBITDA	**US$ mil.**	**0.0**	**0.0**	**0.0**	**1.6**	**1.6**	**1.6**	**1.7**	**1.7**	**15.8**	**16.1**	**16.5**	**16.9**	**17.2**	**17.6**	**18.0**	**18.4**	**18.8**	**19.2**	**19.6**	**20.0**	**20.5**	**20.9**	**21.4**	**21.9**	**22.3**	**22.8**	**23.3**
CAPEX (Circuit 1)	US$ mil.	0.0	(76.3)	(50.9)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Working Capital variation	US$ mil.	0.0	0.0	(2.0)	(2.2)	(0.5)	(0.6)	(0.7)	5.3	(0.0)	(1.0)	(0.1)	(0.1)	(0.1)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.3)	(0.3)	(0.3)	(0.3)	(0.4)	(0.4)	(0.4)	(0.5)
Project Cash Flow	**US$ mil.**	**0.0**	**(76.3)**	**(52.9)**	**(0.6)**	**1.1**	**1.0**	**0.9**	**7.0**	**15.8**	**15.1**	**16.4**	**16.7**	**17.1**	**17.5**	**17.8**	**18.2**	**18.6**	**19.0**	**19.4**	**19.8**	**20.2**	**20.6**	**21.1**	**21.5**	**21.9**	**22.4**	**22.8**

Financial Analysis of EDM

Historical Analysis

30. Historical analysis of EDM's financial performance was carried out for 2014 – 2018. This was a period of difficult macroeconomic environment where the Mozambican metical (versus the U.S. dollar) dropped by nearly 85 percent between December 2014 and December 2018 while the accumulated inflation was close to 50 percent in the same period.

31. Table 5.6 presents key performance indicators of EDM.

Table 5.6. Key Performance Indicators of EDM

KPIs	Units	2014	2015	2016	2017	2018(p)
Average tariff (excluding exports)	US¢/kWh	8.04	6.78	6.25	8.20	10.11
Average export tariff	US¢/kWh	8.81	10.54	12.63	5.70	4.95
Average tariff (including exports)	US¢/kWh	8.08	7.46	8.05	7.68	9.16
Average energy fuel and purchase cost	US¢/kWh	3.17	5.15	6.74	6.36	7.87
Variable margin per unit	US¢/kWh	4.91	2.31	1.31	1.32	1.29
OPEX/kWh	US¢/kWh	3.75	2.66	1.93	1.95	2.48
Total losses	%	23.20	25.20	24.00	26.80	29.40
OPEX/customer	US$/customer	103.30	87.20	71.60	63.20	76.35
Fixed assets/kW	US$/kW	1,827	1,538	1,194	1,338	1,461
Fixed assets/kWh	US¢/kWh	41.20	31.90	26.90	28.80	27.31

Note: (p) = provisional.

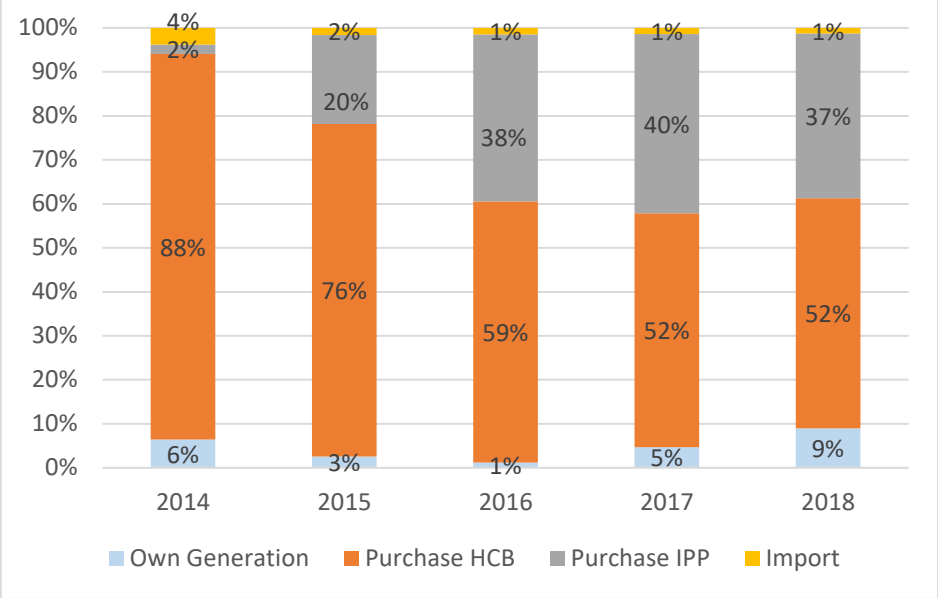
32. Since 2014, Mozambique's generation capacity has expanded to 2,724 MW to serve local and regional demand, with significant participation from the private sector through IPPs. In February 2015, a 175 MW gas-fired IPP was commissioned at CTRG, a joint venture between EDM (51 percent) and Sasol (49 percent). In December 2015, a 120 MW IPP was also commissioned at CTRG. In October 2017, a 40 MW gas-fired IPP (Kuvaninga) was commissioned in Chokwe. All three IPPs have signed PPAs with EDM. The entry into operation of these plants transformed EDM's energy balance, significantly modifying the unit cost of generation.

33. In 2018, EDM supplied a total of 6,613.7 GWh, a 4.5 percent increase compared to 2017 output largely driven by the increase in own generation. Power purchases from HCB improved marginally in 2018 but Cahora Bassa dam did not operate at full capacity due to low levels of water in the reservoir. In December 2016, the elevation of the reservoir fell to 312 m above sea level, the lowest recorded since the construction of the dam. There was a significant recovery in 2017 and by the end of the year the elevation had reached almost 318 m; however, this level is still way below the elevation of 326 m necessary for normal operation of HCB.

Table 5.7. EDM Energy Balance

EDM Energy Balance	Unit	2014	2015	2016	2017	2018
Own generation	GWh	318.0	158.0	82.7	297.6	595.1
Purchased from HCB	GWh	4,351.0	4,599.0	4,166.8	3,361.7	3,458.4
Purchased from IPPs	GWh	102.0	1,229.0	2,665.6	2,580.2	2,476.6
Import	GWh	190.0	98.8	102.9	87.0	83.6
Total supply	**GWh**	**4,961.0**	**6,084.8**	**7,035.0**	**6,505.6**	**6,613.7**

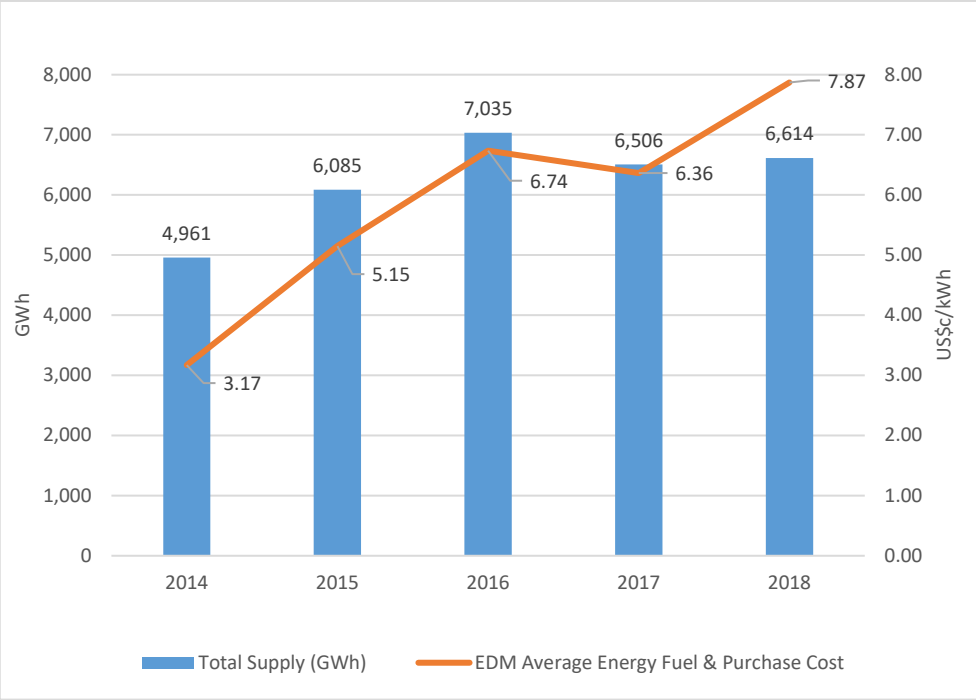
Figure 5.1: EDM Energy Mix - Percentage of Energy Supplied by Source (GWh)



Source: Adapted from EDM data 2014 – 2019.

34. The shift in the generation mix toward thermal generation and the fact that the energy acquisition prices are denominated in hard currency, as per the PPAs, exacerbated the negative impact of IPPs on EDM's cost structure during the rapid devaluation of the Mozambican metical versus the U.S. dollar across the period analyzed. In 2018, the average unit energy fuel and purchase cost reached US¢7.87 per kWh.

Figure 5.2. Total Electricity Supplied and Average Unit Cost for Energy Purchases



Source: Adapted from EDM data 2014 – 2019.

35. The increases in the energy purchase costs in 2014–2018 coupled with the negative impact of depreciation and inflation largely offset the increases in the average tariff during the same period. As a result, EDM's financial situation deteriorated. Specifically, the EBITDA decreased during 2014–2016 and turned negative in 2017. The EBITDA remained negative in 2018 while improving from the 2017 level. Other indicators of profitability had a similar pattern in 2014–2018.

Table 5.8. EDM Financial Performance - Income Statement

Financial Income Statement (MZN, millions)	2014	2015	2016	2017	2018 (p)
Domestic revenues	9,214	10,577	14,841	20,153	24,273
Exports	445	3,643	11,764	3,985	2,764
Electricity sales	9,659	14,220	26,605	24,138	27,037
Other revenues	1,081	2,129	2,517	2,934	3,352
Total revenues	**10,740**	**16,349**	**29,122**	**27,073**	**30,389**
Growth		*52%*	*78%*	*−7%*	*12%*
Total variable cost	−3,792	−9,810	−22,269	−20,876	−23,207
Growth		*159%*	*127%*	*−3%*	*9%*
Gross profit	**6,947**	**6,538**	**6,852**	**6,205**	**7,182**
Growth		*−6%*	*5%*	*−9%*	*15%*
Total fixed costs	−4,486	−5,697	−6,381	−6,593	−7,320
Growth		*27%*	*12%*	*3%*	*11%*
EBITDA	**2,461**	**842**	**472**	**−387**	**−138**

Financial Income Statement (MZN, millions)	2014	2015	2016	2017	2018 (p)
Growth		*−66%*	*−44%*	*−182%*	*−64%*
Total non-operating items	−2,360	−3,047	−2,901	−2,810	−2,573
Earnings Before Interest and Tax (EBIT)	**101.2**	**−2,205**	**−2,429**	**−3,195**	**−2,711**
Total interest - gain (loss)	−173	−1,132	1,417	406	−819
Income tax - revenue (expense)	11	770	28	598	0
Net profit after tax	**−61**	**−1,945**	**−983**	**−2,191**	**−3,530**

Note: (p) = provisional

36. EDM's cash position has also worsened in the period examined. The operating cash flow remained positive during 2014–2018 largely due to the accumulation of payables.

Table 5.9. EDM Financial Performance - Cash Flow Statement

Cash Flow Statement (MZN, millions)	2014	2015	2016	2017	2018 (p)
EBITDA	2,461	842	472	−387	−138
Taxes	11	770	28	598	0
MWK change	3,842	9,179	2,487	−792	2,065
Other assets/liabilities change	211	1,228	791	2,197	275
(=) Net cash from operating activities	6,525	12,019	3,778	1,615	2,202
Net cash from investing activities	−7,151	−9,833	−18,197	−14,979	−6,096
Net cash from capital increase	0	0	0	7,029	663
Net cash from financing activities	462	−1583	15343	5818	−315
(=) Net increase in cash and cash equivalent	−164	603	925	−517	−3,546
(+) Cash at beginning of the year	2,680	2,844	3,447	4,372	3,855
(+) Cash at end of the year	2,844	3,447	4,372	3,855	309

Note: (p) = provisional

37. During the period of analysis, the OCF was insufficient to cover the CAPEX, indicating a gap between financial needs of EDM due to higher investments and internal self-financing capabilities, which has been growing almost every year. In 2017, EDM's financial situation, which was under distress, required MZN 7 billion equity injection. As a consequence, there was an increase in fixed assets and accounts receivables, which were financed by loans from multilateral development banks, donations and grants, and accounts payable.

Table 5.10. EDM Financial Performance - Balance Sheet (MZN millions)

Balance Sheet - IFRS	2014	2015	2016	2017	2018(p)
Accounts receivable - net	996	3,170	9,753	6,960	7,954
Inventory	1,393	1,366	1,307	1,617	3,123
Income tax receivable	0	209	0	0	0
Other financial current assets	386	1,194	2,157	2,107	5,472
Other current assets	838	1,273	4,954	5,648	7,176
Cash	2,844	3,447	4,372	3,855	309
Total current assets	**6,456**	**10,659**	**22,543**	**20,188**	**24,034**
Land	27,688	25,416	24,508	24,103	24,103

Balance Sheet - IFRS	2014	2015	2016	2017	2018(p)
Plant, Property and Equipment	13,568	22,600	38,682	50,666	54,189
Others	1,528	2,066	3,159	2,288	2,288
Total fixed assets	**42,784**	**50,082**	**66,348**	**77,057**	**80,580**
Total assets	**49,241**	**60,741**	**88,891**	**97,245**	**104,614**
Accounts payable	4,760	10,018	23,952	20,523	25,087
Accrued liabilities, interco and other	320	399	567	569	1,374
Donations and grants	395	338	414	187	
Other Financial Liabilities	1,466	2,636	324	1,527	2,713
Short Term Borrowings	415	1,046	7,331	7,033	4,669
Total Current Liabilities	**7,356**	**14,437**	**32,588**	**29,840**	**33,843**
Donations and grants	6,852	7,685	8,697	9,912	10,762
Other Financial Liabilities	8,211	14,982	509	483	134
Long Term Borrowings	2,684	1,501	25,758	31,468	37,611
Accounts payable	102	0	0	0	0
Deferred tax	3,248	2,666	2,429	1,831	2,127
Provisions	6,168	6,696	6,789	6,993	6,949
Total Long-Term Liabilities	**27,265**	**33,529**	**44,182**	**50,687**	**57,583**
Total Capital and Reserves	**14,619**	**12,775**	**12,121**	**16,718**	**13,188**
Total Liabilities and Equity	**49,241**	**60,741**	**88,891**	**97,245**	**104,614**

38. The historical financial ratios measuring the profitability, liquidity, and leverage of EDM are presented in table 5.11.

Table 5.11. EDM Financial Ratios

Main Financial Ratios	2014	2015	2016	2017	2018(p)
Profitability and cash generation ratios					
Gross profit/revenue (%)	64.7	40.0	23.5	22.9	23.6
OPEX/gross profit (%)	41.8	34.8	21.9	24.4	24.1
CAPEX/gross profit (%)	66.6	60.1	62.5	55.3	20.1
EBITDA/fixed asset (%)	5.8	1.7	0.7	−0.5	−0.2
EBITDA/depreciation and amortization (%)	104.3	27.6	16.3	−13.8	−5.4
EBITDA/CAPEX (%)	34.4	8.6	2.6	−2.6	−2.3
OCF/CAPEX (%)	88.8	110.7	28.6	13.5	−31.0
Liquidity ratios					
Current ratio	0.88	0.74	0.69	0.68	0.71
Acid test	0.69	0.64	0.65	0.62	0.62
Days Sales Outstanding	33.85	70.77	122.24	93.84	95.53
Leverage ratios					
Debt to equity	1.87	3.13	5.58	4.21	6.12
Debt to asset (%)	56	66	76	72	77

Note: (p) = provisional.

39. Debt—fueled by the need to keep up with the investment plan for generation, transmission, and distribution activities—grew significantly during the period. EDM closed in 2018 with a debt/equity ratio of 6× compared with a maximum typically accepted range in the industry of between 3.5× and 4×. The debt/asset ratio at the end of 2018 was 77 percent, slightly above the maximum typically accepted range of between 60 percent and 70 percent.

40. Cognizant of this situation, EDM, with support from the World Bank, initiated the preparation of a Cost of Service Study in 2017 that provided the analytical foundations for the development of a comprehensive FSP. Based on the recommendations of this study, the GoMO, MIREME, and EDM have initiated the implementation of the FSP. The FSP includes (a) increase of electricity tariffs followed by adjustments in line with domestic inflation and changes in electricity purchase costs that should be passed through; (b) improvement of EDM's operational efficiency through reduction of technical and commercial losses; (c) ensuring of sustainable funding for electrification; and (d) a recapitalization of EDM's debt in line with the recommendations of the Cost of Service Study (50 percent recapitalization).

41. The implementation of the FSP has been progressing. Specifically, the GoMO enacted 25 percent increase in end user tariffs in two phases: on December 1, 2018, for high and medium voltage customers and on March 1, 2019, for low voltage customers (which includes residential customers). The GoMO approved an NES in 2018, which limits EDM's responsibility for funding new connections to a service area of 100 m around the existing distribution lines, with the GoMO being responsible for financing expansion of access outside EDM's servitude boundaries. The NES established a National Electrification Account that would pool the funding for the Government's electrification plan to be implemented by EDM (on-grid) and FUNAE (off-grid) electrification. The funding is to be provided by contribution from the GoMO's budget, generation concessions fees, taxes on electricity exports, concessional financing from development partners, and contribution from existing electricity consumers through an electrification levy.

42. The World Bank supports the implementation of the FSP through the ongoing investment financing operations and TA. Specifically, the PERIP supports EDM with operational efficiency improvement measures and, particularly, the loss-reduction action plan that has been agreed with EDM. The recently approved ProEnergia Project (P165453) will support electrification efforts of the GoMO. In addition, the GoMO and EDM receive sizable TA (including for implementation of the FSP) as part of investment financing projects and the ongoing ESMAP TA.

43. Projections of EDM's financial performance have been carried out assuming that the key measures of the FSP will be implemented as planned. These assumptions include (a) implementation of PERIP's Component 2 to reduce system losses, from 29 percent in 2018 to 19 percent in 2024; (b) financing of electrification according to the NES; and (c) adjustment of electricity tariffs in line with domestic inflation and full pass-through of generation costs. Because the discussions between the GoMO and EDM for recapitalization of EDM's on-lent debt are ongoing, this measure of the FSP is not factored in the financial projections. If implemented, this measure will strengthen the balance sheet of EDM and improve its solvency ratios.

Profitability

44. Under the assumption of FSP implementation, EDM is expected to start becoming operationally profitable in 2019 with negative but improved profitability. EDM's return on invested capital (ROIC) is expected to recover to around 4 percent in 2021–2024. EDM's return on equity (ROE) is expected to improve to 6 percent in 2021 and maintain positive figures in 2023–2024.

Table 5.12. EDM Income Statement: Projections of Key Items (US$, millions)

	2019	2020	2021	2022	2023	2024

Net revenues	630.6	688.6	746.9	835.2	965.3	1146.2
EBITDA	66.9	110.8	159.3	173.9	218.6	205.3
EBIT	22.7	64.1	107.0	113.6	152.9	131.8
Net profit	−51.8	−17.1	20.6	29.5	60.4	49.7

Table 5.13. EDM Profitability Ratios

	2019	2020	2021	2022	2023	2024
EBITDA margin (%)	11	16	21	21	23	18
Operating margin (%)	4	9	14	14	16	11
Net margin (%)	−8	−2	3	4	6	4
ROE (%)	−23	−6	6	7	9	6
Return on Assets - ROA (%)	−3	−1	1	1	2	2
ROIC (%)	1	3	4	4	5	4

Liquidity and Leverage

45. EDM's liquidity position remains weak as long as EDM continues to have sizable payables, including to IPPs. The quick ratio is expected to remain in the range of 0.4× to 0.5× within the forecasting period, substantially below the required 1:1. However, this level of liquidity should allow EDM to meet its recurrent payment obligations and increasingly settle its accumulated arrears, including to IPPs.

Table 5.14. Liquidity and Solvability Ratios

	2019	2020	2021	2022	2023	2024
Quick ratio - (cash + current receivables)/current liabilities	0.42	0.41	0.42	0.43	0.47	0.53
Current ratio - current assets/current liabilities	0.64	0.64	0.67	0.70	0.78	0.92
Leverage - long-term debt/equity	2.7	2.8	2.6	2.3	1.7	1.5
Total liabilities/Total assets (%)	88	86	84	81	75	71
ICR (EBITDA/Interest expenses) (%)	90	136	208	247	341	350
DSCR (excluding CAPEX)	1.07×	1.05×	1.53×	1.55×	1.57×	2.28×
CFO/Debt[a] (%)	5	4	6	6	7	7

Note: CFO = Cash flow from operations.

a. Debt = Short-term borrowings + long-term borrowings + current portion of long-term borrowings.

46. EDM's debt is largely concessional. As a result, the ICR becomes adequate from 2020 onwards as EDM becomes profitable. The DSCR will also improve substantially, reaching a comfortable level of above 1.25× by 2021.

Financial Analysis of ESCOM

47. Malawi's energy sector has gone through important sector reform efforts recently, including the unbundling of the national power utility, ESCOM, with its generation functions and assets being moved to a new state owned generation company, EGENCO. The restructured ESCOM has adopted and implemented a new organizational structure that incorporates a single buyer and system and market operator functions; however, the process is currently underway, with the remaining functions of ESCOM still being defined and effective decision-making powers still centralized. Overall, the

sector's success is largely dependent on improving ESCOM's operating and financial condition to generate liquidity and attract new investments.

48. Hampered by payments in arrears from customers and low tariffs, ESCOM is incurring loss and i.e. in poor financial condition, which restricts its ability to upgrade network infrastructure. ESCOM's lack of creditworthiness and issues in meeting its financial obligations have left it unable to be a viable counterparty to private investors. In addition to low and below cost-reflective tariffs, ESCOM's poor financial condition over the past few years has also been caused by low collection rates from public entities, high payment arrears to power suppliers, suboptimal operating performance with incidence of high operating expenses as a percentage of total revenues, insufficient network maintenance, and inability to deliver sufficient power due to high technical and non-technical losses, currently at 20.9 percent. To temporarily meet its financial needs, ESCOM has resorted to taking up working capital loans at high interest rates, leading to an increase in liabilities. As long as electricity tariffs remain below the cost of power supply and network maintenance, ESCOM risks remaining loss-making with cyclical payment arrears.

49. However, ESCOM's financial outlook appears to be positive due to a strong Government commitment toward supporting ESCOM's financial recovery and additional measures to be introduced by ESCOM including: (a) payment of arrears to ESCOM by state-owed entities; (b) 31.8 percent phased tariff increase effective from October 2018 to September 2022; (c) reduced dependence on working capital loans; (d) overall operating cost reduction as a percentage of revenues; and (e) improved borrowing capacity and better financial discipline through timely servicing of multilateral loans.

50. ESCOM's ability to deliver quality services and deploy its investment program depends on the company's ability to generate and sustain positive cash flows to meet its operating and CAPEX requirements, and to improve its financial condition. ESCOM's cash flows are critically related to two elements: (a) the level of retail power tariffs, which are reviewed and approved by the MERA, and (b) increasing efficiency in cost and net working capital management.

51. MERA approves tariffs on a four-year cycle and a rising block tariff is used with differentiation between single and three-phase consumers, effectively creating a differentiated tariff between domestic and industrial/commercial consumers while allowing for some cross-subsidization between the different types of consumers. There are automatic adjustments for major cost fluctuations such as the exchange rate and inflation. ESCOM's increasing cost base and investments are incorporated into tariffs only after being submitted to MERA for approval, i.e. when expenses are actually paid, and CAPEX is deployed. The Government is responsible for financing cash flow shortfalls, but this has not been required over the past two to three years as the lack of CAPEX by ESCOM has led to sufficient resources being available to meet its financial obligations.

52. Even after a 31.8 percent cumulative increase in power tariffs as approved by MERA for the four-year period, from October 1, 2018, to September 30, 2022, tariffs will remain below cost recovery. This 31.8 percent increase was offered in response to ESCOM's application for a 60 percent power tariff increase over the same duration. Despite this increase, cross-subsidies among the different consumer segments persist. The regulator's determination of the level of tariff increase was mainly based on ESCOM's short-term, relatively cash-liquid financial position resulting from the absence of major investments in the past few years and limited long-term borrowings. However, tariff increase is needed in the medium term to support ESCOM's solvency and liquidity together with its ability to raise financing to fund its capital investment program for electrification and network expansion.

53. At the end of FY18, ESCOM reported a net loss of MWK 19,674 million[52], from a profit of MWK 5,451 million in FY17, due to the effects of ESCOM's unbundling of its generation assets into the state-owned generation company EGENCO. This led to an increase in ESCOM's cost of purchased energy and increase in operating expenditures. In addition,

[52] According to ESCOM's draft audited financial statements for 2018, losses amounted to MWK 12.963 billion.

application of the new tariff adjustment will occur only in mid-FY19. The unbundling makes FY18 and FY17 not fully comparable in terms of operating performance. Despite the negative operating profit in FY18, during the past couple of years ESCOM made increasing efforts and substantial progress in cleaning up its balance sheet through support from the MCC compact. ESCOM has just three long-term loans on its balance sheet i.e. from the World Bank's ESSP project, for the GoMA's Optic Fiber Network Project, and FDH Bank's commercial loan to provide a guarantee to Aggreko for ESCOM's payment obligations under the power lease agreement. In addition, as a result of reduced CAPEX, limited financial borrowings, and additional loan and grant disbursements during the year, ESCOM ended its 2018 with a cash surplus of MWK 5,505 million.

54. ESCOM's financial assessment reflects the information contained in the company's audited financial statements for 2014 - 2017, the unaudited financial information for 2018 as provided by ESCOM in March 2019 and the financial projections for 2019 – 2029.[53]

Historical Financial Analysis

55. A historical financial analysis was carried out for ESCOM through a review of its financial statements and key performance indicators for FY14 - FY18. This analysis showed a decline in the company's operating performance with operating margins decreasing by double digits from a peak of MWK 15,030 million in 2015 to an operative loss of MWK 15,547 million in 2018 and a gradual deterioration in ESCOM's financial situation, with negative FCF generation at the end of the analyzed period.

56. The analysis of ESCOM's operational data presented in table 5.15 shows a decline in energy produced between FY15 and FY17, due to the severe droughts leading to low water levels in the Shire river and thus in the country's hydropower production. In FY18, net energy available for distribution rose by 8.7 percent, mostly related to the contribution of Aggreko's emergency diesel generation plants, that EGENCO rented for three years (until 2020) to reduce the energy deficit and compensate for the loss in hydropower production.

57. Moreover, the system has been historically incurring high transmission losses currently at 5.3 percent caused by wheeling power over long distances at low voltages (that is 66 kV and 33 kV). In this context, the company was unable to significantly reduce its energy (T&D) loss rate over the period. In particular, total energy losses reached a high of 20.9 percent of energy supplied to the network in FY18, rising from 19.5 percent in FY17 (24.2 percent recorded in FY15). Important interventions are needed to materially reduce non-technical losses in ESCOM's distribution power grid currently at 9.3 percent as principally caused by fraud deliberately perpetrated by individuals, including thefts, vandalisms of ESCOM infrastructure, illegal electricity connections, encroachment of ESCOM's way-leaves, and illegal extension of power.

Table 5.15. ESCOM Historical Operating Data

	Unit	2015	2016	2017	2018
Energy produced by EGENCO[a]*	GWh	1,972.0	1,973.9	1,811.5	1,870.4
Transmission Losses	GWh	126.2	114.5	103.3	99.1
Distribution Losses	GWh	351.0	309.9	250.0	291.8
- Technical	GWh	126.2	136.2	112.3	117.8
- Non-technical	GWh	224.8	173.7	137.7	173.9
Net Energy Distributed	**GWh**	**1,494.7**	**1,549.5**	**1,458.3**	**1,479.5**
Losses					
Transmission Losses	%	6.4	5.8	5.7	5.3

[53] ESCOM Fiscal Year ends on June 30. 2018 would therefore be July 1, 2017, through June 30, 2018.

	Unit	2015	2016	2017	2018
Distribution Losses	%	17.8	15.7	13.8	15.6
- Technical	%	6.4	6.9	6.2	6.3
- Non-technical	%	11.4	8.8	7.6	9.3
Total Losses	**%**	**24.2**	**21.5**	**19.5**	**20.9**

Note. [a] Energy net of power used for self-generation.*

58. ESCOM's net sales increased steadily from MWK 61,024 million in FY15 to MWK 93,039 million in FY18, with a 15 percent compound average annual growth rate: this level was, however, far higher than the growth in energy sales in GWh, and uniquely reflects the 48 percent cumulative adjustment in power tariffs during the past four years. Despite the revenue growth, ESCOM's EBIT dropped from MWK 15,030 million in 2015 to negative MWK 15,547 million in FY18. As a result, the EBIT unit margin dropped from MWK 9.1 per kWh in 2015 (corresponding to US¢1.8 per kWh) to negative MWK 9.9 per kWh in 2018 (or US¢1.4 per kWh). This decline was due to an almost tripling of energy purchases expenditure and inefficiencies in the management of operating costs, which were not covered by a corresponding growth in total revenues. In particular, ESCOM's total sales across FY15 - FY18 grew at a compound average growth rate (CAGR) of 15 percent, versus a CAGR of almost 40 percent for total cost base (energy costs plus operating expenses). Net profit levels followed ESCOM's operating performance, going from around MWK 14.5 billion in FY15 to a loss of nearly MWK 20 billion at the end of FY18.[54]

59. In FY18, total energy purchases plus operating expenditures rose to MWK 106 billion, more than doubling from around MWK 40 billion in FY16. The disproportional increase in total cost base is mainly due to the following elements:

(c) Rigid OPEX structure, with significant increase in payroll expenses and consumption of goods and services.

(d) Much higher transmission costs: As a result of ESCOM's functional unbundling, the business unit in charge of transmission activities and accounts has become responsible also for power purchases, which are now included in ESCOM's accounting system.

(e) Steady growth in distribution costs to operate, maintain, and expand the distribution network.

Table 5.16. ESCOM Historical Profit and Loss

	Unit	2015 Audited	2016 Audited	2017 Audited	2018 Unaudited
Exchange Rate	US$/MWK	501	714	726	733.95
Energy Sold	GWh	1,659	1,494	1,419	1,565
Power Tariff	MWK/kWh	33.8	49.7	58.9	73.2
Power Tariff	US¢/kWh	6.74	6.96	8.11	9.98
Total Revenues	**MWK million**	**61,024**	**74,787**	**84,695**	**93,039**
Unit Revenues	MWK/kWh	36.8	50.1	59.7	59.4
Growth Rate	*%*	*8.7*	*36.1*	*19.2*	*-0.4*
Power Purchase and OPEX	MWK million	(39,533)	(47,904)	(73,274)	(105,892)
EBITDA	**MWK million**	**21,491**	**26,883**	**11,421**	**(12,854)**
EBITDA Margin	*%*	*35*	*36*	*13*	*-14*

[54] According to the draft audited financial statements for 2018, ESCOM's net loss was MKW 12.963 billion.

	Unit	2015 Audited	2016 Audited	2017 Audited	2018 Unaudited
EBITDA Unit Margin	MWK/kWh	13.0	18.0	8.0	(8.2)
EBITDA Unit Margin	US¢/kWh	2.6	2.5	1.1	(1.1)
Depreciation & Amortization	MWK million	(6,461)	(14,585)	(4,877)	(2,693)
EBIT	**MWK million**	**15,030**	**12,298**	**6,544**	**(15,547)**
EBIT Margin	*%*	*24.6*	*16.4*	*7.7*	*-16.7*
EBIT Unit Margin	MWK/kWh	9.1	8.2	4.6	(9.9)
EBIT Unit Margin	US¢/kWh	1.8	1.2	0.6	(1.4)
Interest Charges	MWK million	750.0	(2,250.0)	(208.5)	(246.1)
Other financial costs/income	MWK million	(1,280.7)	3,130.8	(884.5)	(3,131.8)
Taxes	MWK million	0.0	(5,850)	0.0	(749.6)
Net Profit	**MWK million**	**14,499**	**7,329**	**5,451**	**(19,674)**
Net Margin	*%*	*23.8*	*9.8*	*6.4*	*-21.1*

60. The analysis of ESCOM's historical balance sheet and cash flow statements (see table 5.17) shows a relatively liquid position, with only limited negative FCF generation in FY18 despite ESCOM's poor operating performance during the year. While this negative trend could have potentially led to a significant deterioration of ESCOM's financial condition, during FY18 the utility was still able to reduce the negative impact on FCF generation owing to the availability of additional borrowing and cash reserves coming from rising trade payables, which were sufficient to make up for any potential shortfalls.

61. ESCOM has continued to manage its cash position effectively and remained liquid at the end of the analyzed period, due to the significant increase in trade payables (current liabilities went from MWK 6 billion in FY 2015 to over MWK 63.5 billion in FY18) as a result of larger energy purchases and arrears to Aggreko diesel-fired power plants (operational since mid-FY18) and arrears for EGENCO energy purchases. However, ESCOM's working capital management requires monitoring and may be a cause for concern over the longer period, indicating that if it persists, the company would struggle to make ends meet and have to rely increasingly on borrowings or additional equity infusion to finance its short-term liabilities.

62. Owing to the recent power tariff increase approved by MERA for October 2018 - 2022, ESCOM will have gained sufficient headroom to absorb the necessary debt to cover its operations and investment plan for the medium term (provided assumptions related to retirement of working capital debt, reduction in operating expenses as percentage of revenues, and improved collection rate are realized). However, its borrowing capacity and ability to cover future investments for electrification and new transmission lines (that is Mozambique-Malawi interconnector, together with Zambia-Malawi interconnector) will remain contingent upon the energy regulator MERA's decision on any new power tariff increases and on ESCOM achieving its operating efficiency targets.

Table 5.17. ESCOM Historical Balance Sheet and Cash Flow Statements

	Unit	2015 Audited	2016 Audited	2017 Audited	2018 Unaudited
BALANCE SHEET					
Current assets	MWK million	42,585	56,406	44,184	60,958
Non-current assets	MWK million	31,563	50,694	75,105	125,928
Total Assets	MWK million	**74,148**	**107,100**	**119,289**	**186,885**
Current liabilities	MWK million	6,012	21,420	22,288	63,556
Non-current liabilities	MWK million	30,060	17,136	53,590	98,977
Total Liabilities	MWK million	**22,044**	**44,982**	**75,878**	**162,533**
Equity	MWK million	52,104	62,118	43,411	24,353
Total Liabilities & Equity	MWK million	**74,148**	**107,100**	**119,289**	**186,885**
Net Financial Position	MWK million	(21,543)	(8,073)	(6,315)	24,416
Net Working Capital	MWK million	15,030	27,132	15,972	(8,106)
CASH FLOWS					
CFO	MWK million	16,533	6,426	22,506	16,168
Cash flows after investments	MWK million	(7,515)	(25,704)	(39,204)	(45,783)
Cash flows after financing activities	MWK million	(16,533)	(14,280)	(34,848)	44,973
FCF Generation	**MWK million**	**9,018**	**(11,424)**	**(4,356)**	**(810.1)**
Net Cash at the end of the period	**MWK million**	**22,044**	**10,710**	**6,534**	**5,505**

Analysis of ESCOM's Historical Financial Ratios

63. Table 5.18 summarizes ESCOM's main profitability, liquidity, and leverage ratios during the past four years. In particular, ESCOM's profitability has experienced an important downward trend since FY15. All profitability metrics gradually declined from a solid position in FY15 to low levels in FY18, when EBIT margin hit a negative 16.7 percent. ESCOM's worsening operating performance is also confirmed by the Return on Capital Employed (ROCE) and the ROE. ROCE experienced a peak in FY15 (49.2 percent) before dropping to 17.6 percent in 2017 and to 13.2 percent in FY18, due to the sharp slowdown in operating performance combined with the increase in network investments mostly financed through own cash generation. ESCOM's ROE also experienced a similar pattern, going from 27.8 percent in 2015 to 12.6 percent in FY17 and, a negative value in FY18, as a result of the net loss recorded for the year.

Table 5.18. ESCOM Historical Financial Ratios

	Unit	2015 Audited	2016 Audited	2017 Audited	2018 Unaudited
EBIT Margin	%	24.6	16.4	7.7	-16.7
Quick Ratio	x	5.6	1.5	1.2	0.7
Current ratio	x	7.1	2.6	2.0	1.0
Interest Coverage Ratio (EBIT/Interest Charges)	x	-20.0	5.5	31.4	-63.2
Return on Investment (ROI)	%	49.2	22.8	17.6	-13.2
Return on Equity (ROE)	%	27.8	11.8	12.6	-80.8
Net Working Capital on Sales	%	24.6	36.3	18.9	-8.7
Indebtedness (Liabilities/Assets)	%	29.7	42.0	63.6	87.0

	Unit	2015 Audited	2016 Audited	2017 Audited	2018 Unaudited
Gearing (Net Financial Debt / Equity)	%	-41.3	-13.0	-14.5	100.3
Debt Service Coverage Ratio (DSCR)	x	11.2	2.1	13.6	-25.6

64. ESCOM's liquidity, with positive net cash reached at the end of each fiscal year analyzed, has led to relatively satisfactory short-term liquidity metrics across FY15 - FY18. In particular, quick and current ratios which are indicators of the company's short-term liquidity position and measure its ability to meet its short-term obligations with its most liquid assets showed average levels of 2.2x and 3.2x respectively, across the period analyzed, thereby indicating that ESCOM had sufficient liquidity to be able to instantly cover its current liabilities by using its cash equivalent assets.

65. Net working capital as a percentage of sales went from around 25 percent in 2015 to 8.7 percent in 2018. This means that during FY18, ESCOM has been financing its growth in sales and fueling its FCF generation by effectively borrowing from its suppliers and customers. This came after a relatively healthy net working capital management by ESCOM between FY15 and FY17, when the average level of days payables (48 days) compared to the average collection period days[55] (100 days) showed that ESCOM was paying its suppliers faster than it was collecting from its customers. This tendency was reversed during 2018 when days payables reached a record level of almost 310, compared to 75 days as collection period days, as a result of the following:

- Trade payables in FY18 rose to MWK 63,556 million from MWK 22,288 million in FY17, due to ESCOM's issues in finalizing payments for energy purchases from Aggreko emergency power plants. Indeed, according to an existing agreement between the two parties, ESCOM has to pay Aggreko for both diesel fuel and power generation on a monthly basis. For this reason, ESCOM has had to sign a new long-term loan with NBS Bank (MWK 30 billion, corresponding to around US$40 million), to cover its increasing current liabilities.[56]

- Increasing payment arrears with EGENCO for the purchase of electricity from hydropower generation. According to ESCOM, these are estimated at MWK 30 billion for FY18.

66. According to the FY18 unaudited financial accounts, ESCOM also reported outstanding trade receivables of MWK 37.6 billion, compared to MWK 20.9 billion in FY17, which are expected to be paid during the following FY19; MKW 20 billion of total receivables are estimated to refer to public offices, schools, hospitals, and army. According to ESCOM's management, this significant growth which has continued over FY19 is mainly due to issues with the implementation of a new MIS, launched in January 2018 and jointly sponsored by ESCOM and MCC through MCA-Malawi. The system has replaced the old billing accounting systems that was being used at ESCOM. In future, the utility aims to ensure that the organization's business processes and information systems are well aligned to the industry's best practices for enhanced customer service and improved service delivery. However, in the short term immediately following its integration, the MIS

[55] A collection period of 200 days is within average threshold noted within the electric utility industry.
[56] To cover its short-term financial obligations, since the beginning of 2018, ESCOM has signed two expensive loans: (a) a US$ 3 million loan (18.5 percent interest rate) with FDH Bank, to pay Aggreko for a guarantee on its future power purchases: the amount of the guarantee is equivalent to three months of payment obligations under the emergency power plants' lease agreement, (b) a US$ 40 million loan (16.5 percent as interest rate) to cover the important increase in trade payables due to Aggreko power purchases on a monthly basis. The definitive date for NBS loan disbursement is not known yet, as the GoMA needs to issue a guarantee first which needs to be approved by the Parliament. The country's national elections in May 2019 made it difficult to estimate when cash from the loan will come through to replenish arrears to Aggreko.

has created several issues such as revenues not being correctly billed, thereby resulting in increasingly higher trade receivables, along with lower trade payables.[57]

67. Since FY15, the utility's capital structure has proven to be solid with low leverage, as shown by limited long-term debt on ESCOM's balance sheet at the end of FY18. At this time, only three long-term loans appeared on the balance sheet:

(a) US$12million loan (corresponding to around MWK 9 billion) of World Bank IDA Credit under the ESSP (P099626), effective in December 2011, with a grace period of 10 years, an interest rate of 1 percent for the first ten years, and 2 percent thereafter, and with installment repayments starting in December 2021.
(b) US$23 million loan from the GoMA to finance investments in the new Optic Fiber Network Project, effective March 2017, with a grace period of 5 years and an interest rate of 2 percent. Repayment of principal and interest is expected to start in March 2022.
(c) US$3 million loan from FDH Bank, with no grace period and an interest rate of 18.5 percent, to pay for the Aggreko guarantee (consisting of three-months of payment deposit in the event of non-payment by ESCOM under the PPA).

68. Total indebtedness for the company, calculated as total liabilities on total assets, has remained at acceptable levels for the period analyzed, that is well below the 75 percent critical threshold between 2015 and 2017: this means that ESCOM was able to adequately manage its financial exposure, as shown by a significant decrease in its financial charges. However, in 2018 total indebtedness increased to 87 percent, due to the above-mentioned long-term loans. As a consequence of the low leveraged financial structure and no significant interest charges, ESCOM's ICR was well above the 1x threshold during FY15 - FY17. However, in 2018 the ratio turned negative due to ESCOM's operating loss.

69. ESCOM's DSCR which is a measure of the cash flow available for the company to meet its current debt service obligations (in terms of total installments for the corresponding year) and was below the 1x threshold prior to 2015 grew to levels above the threshold during FY15 - FY17, as a result of the utility's low financially leveraged structure, while at the end of 2018, the DCSR turned negative due to the negative EBITDA for the fiscal year.

Analysis of ESCOM Financial Projections

70. FY19 – FY29 is expected to see a major transformation in the power sector in Malawi. Following years of under-investment, the power sector is poised to move toward a new diversified generation portfolio to supplement existing hydro generation capacity, so that the current power crisis characterized by widespread load-shedding would be better managed. In addition, the Government appears to be on track to achieve a 30 percent electrification rate (from the current 11 percent) by 2030 supported by power tariff adjustments, and ESCOM's expected operational efficiency improvements.

71. ESCOM has been given an important role in bringing about this transformation of the power sector in Malawi. Significant groundwork has been done already, with major investments in T&D infrastructure completed with the support of MCC and the World Bank. Going forward, ESCOM will have to embrace change, related to its operational and financial performance, if it is to rise successfully to the challenge. In particular, ESCOM is planning to execute a significant CAPEX program during 2019-2023, focused both on import capacity reinforcement (transmission interconnections), and on last-mile electrification by connecting 90,000 new customers annually over the same duration.

[57] According to ESCOM's management, the amount of reduced trade payables because of MIS integration in ESCOM billing system is more limited than the increase in trade receivables related to the same issue.

72. The projected financial model for ESCOM is based on the best information currently available and provided by ESCOM management and the GoMA, about the power supply scenario for the following 10 years in Malawi, the potential new annual connections implemented by ESCOM to enable the achievement of a 30 percent electrification target by 2030, and the assumed power tariff adjustments for the regulatory period starting in October 2022.

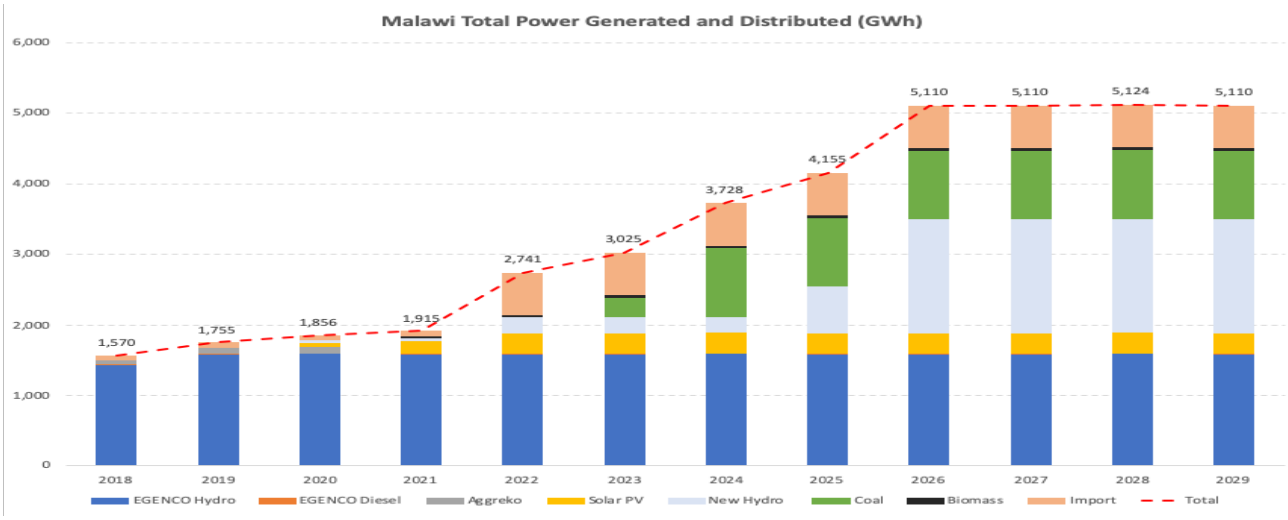
73. Figure 5.3 summarizes power supply projections for Malawi, which is the basis for forecasting ESCOM's revenues, and factors in the following new power generation plants:

- **New hydro capacity**. Ndiza IPP (8MW commissioned in 2020), Tedzani IV (18 MW commissioned in 2022), Bua Mbongozi IPP (25 MW commissioned in 2022), Mpatamanga public-private partnership (150 MW commissioned in 2025 as first tranche, additional 158 MW in 2026 as second tranche).
- **New thermal capacity**. Salima gas power plant (30 MW commissioned in 2021), Kamwamba coal power plant (50 MW commissioned in 2023, additional capacity of 122 MW in 2024, for a total capacity of 172 MW). Aggreko emergency power plants' capacity is expected to phase out during 2020, according to the ESCOM management guideline.
- **New renewable capacity**. Salima solar PV (40MW commissioned in 2020, increasing to a total of 116 MW in 2021), new solar PV IPP capacity (40 MW commissioned in 2022), Gebis Energy biomass (10 MW commissioned in 2021).
- **New import capacity**. Mozambique-Malawi interconnector (50 MW coming on line in 2022, assuming no variation in total import during the analyzed period), Zambia-Malawi interconnector (50 MW coming on line from 2022).

74. ESCOM's financial projections are based on MERA approved tariffs for October 2018 – October 2022, which foresees a 31.8 percent cumulative tariff increase across the period, and on an assumed further 29 percent cumulative increase in power tariffs from October 2022 to October 2026 (new regulatory period). This latest adjustment would factor in the following: (a) ESCOM's investments through IDA financing in the Malawi Electricity Access Project's grid expansion and strengthening component (MEAP); (b) the total capex for the two interconnectors with Mozambique (IDA financing) and Zambia (assumed multilateral financing as IDA Scale-Up facility);[58] (c) additional investments in the transmission network needed to connect the new power plants to the main grid; and (d) additional grid maintenance capex financed through ESCOM's own cash flows.

[58] The loan for financing the Zambia-Malawi Interconnector is assumed to be an IDA Scale-Up Facility, under IBRD rates terms (LIBOR + 1.4 percent, equivalent to 4.19 percent).

Figure 5.3: Malawi Total Power Production Available to ESCOM for Distribution (net of losses)



Source: World Bank elaborations on ESCOM and GoMA data.

75. The conclusions reached through ESCOM's financial analysis are based on the following key assumptions in terms of power tariff evolution, number of yearly additional connections financed under the MEAP and through ESCOM's own funds, cost per new connection, and cost structure management, as detailed below:

(a) The assumed power tariffs for October 2022 - October 2026 factor in an 11 percent increase for the regulatory year ending in October 2023 (MWK 112 per kWh) and a further 6 percent annual increase for the following years. According to the sensitivity analysis, this cumulative 29 percent growth in electricity tariffs over the new regulatory period would allow ESCOM to reach positive FCF generation and, therefore, fully cover its debt service requirements for the additional borrowings incurred to cover the utility's investment plan for the next 10 years.

(b) Under these assumptions, ESCOM would have the ability to generate healthy cash flows, to follow a 40 percent dividend pay-out ratio policy as required by an agreement with its only shareholder, the GoMA to service additional debt and to pay corporate taxes. Current tariffs are too low to allow ESCOM to generate sufficient cash flows to provide adequate power supply through wholesale energy purchases and to deploy its investment program and fund additional customer connections.

(c) The projected power tariffs beyond October 2026 are kept flat for the rest of the projected period (average power tariff for all consumer categories of MWK 133.5 per kWh) and include the financing requirements for new connections by ESCOM.

(d) Power consumption by customer category and CAPEX for electrification have been projected assuming a gradual increase in the number of new connections per year: 34,000 new units connected during 2018, 70,000 new units connected in 2019, and 90,000 new connections per year from 2020 onwards. The additional connections per year beyond those funded by the MEAP (70,000 versus 57,500 in 2020 and 90,000 versus 57,500 from 2021 onwards) would need to be financed by a combination of the utility's own FCF generation and funds from the Accelerated Electrification Program.

(e) ESCOM is expected to optimize the management of its challenging working capital situation characterized by high trade payables for expensive energy purchases, with the integration of the new MIS billing and accounting system, and by reducing its operating expenditures as a percentage of revenues.

(f) Total investment per new connection is assumed at US$350 per kWh in 2019, growing to US$410 per kWh in 2021, and staying at this level thereafter.

76. The projected profit and loss, balance sheet and cash flow statements for ESCOM for 2019 - 2029 are presented in the following tables 5.19, 5.20, and 5.21, respectively.

77. Based on the above assumptions, and assuming a 20 percent compound average growth in power sales between FY19 and FY26 due to expanding power generation supply, ESCOM's net revenues are expected to grow at a compound average rate of 26 percent over the same duration. Thereafter, net sales are projected to remain substantially flat through 2029, due to no further increase in tariffs, and no commissioning of additional generation capacity. As a result of Aggreko diesel-fired plants being retired at the end of FY20 and cost-reflective tariffs being introduced from October 2022, ESCOM's financial condition is expected to improve substantially during the projected period, under the assumption of projected improvements in efficiency and working capital management.

Table 5.19. ESCOM Projected Profit and Loss Statement

(MWK '000)	2018	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E
Tot. Revenues	**93,038,566**	**122,763,199**	**170,825,272**	**185,318,346**	**274,498,166**	**323,376,827**	**424,981,172**	**500,027,082**	**628,195,441**	**660,241,051**	**662,041,164**	**660,241,051**
Total Cost of Sales	**(56,884,642)**	**(64,709,780)**	**(80,681,509)**	**(86,778,577)**	**(139,528,692)**	**(167,131,621)**	**(235,041,857)**	**(269,377,319)**	**(345,725,717)**	**(345,903,237)**	**(347,031,529)**	**(346,258,278)**
% of sales	61%	53%	47%	47%	51%	52%	55%	54%	55%	52%	52%	52%
GROSS PROFIT	**36,153,924**	**58,053,420**	**90,143,762**	**98,539,769**	**134,969,475**	**156,245,206**	**189,939,315**	**230,649,763**	**282,469,724**	**314,337,814**	**315,009,635**	**313,982,773**
OPEX	**(51,700,777)**	**(51,343,424)**	**(60,415,736)**	**(67,403,204)**	**(80,565,157)**	**(88,887,357)**	**(111,494,304)**	**(126,594,821)**	**(148,888,569)**	**(169,197,771)**	**(177,050,449)**	**(188,025,749)**
% of sales	56%	42%	35%	36%	29%	27%	26%	25%	24%	26%	27%	28%
NET OPERATING PROFIT (EBIT)	**(15,546,853)**	**6,709,996**	**29,728,026**	**31,136,566**	**54,404,317**	**67,357,849**	**78,445,011**	**104,054,943**	**133,581,156**	**145,140,043**	**137,959,186**	**125,957,024**
Interest expenses	(246,099)	(313,110)	(4,090,061)	(4,051,171)	(3,331,412)	(2,566,549)	(1,349,134)	(1,268,126)	(2,775,207)	(3,397,581)	(3,290,499)	(3,180,492)
Others	(3,131,783)	0	0	0	0	0	0	0	0	0	0	0
PROFIT BEFORE TAXATION	**(18,924,734)**	**6,396,886**	**25,637,965**	**27,085,395**	**51,072,905**	**64,791,300**	**77,095,877**	**102,786,817**	**130,805,949**	**141,742,462**	**134,668,688**	**122,776,531**
Taxes	(749,604)	0	(7,691,390)	(8,125,618)	(15,321,871)	(19,437,390)	(23,128,763)	(30,836,045)	(39,241,785)	(42,522,738)	(40,400,606)	(36,832,959)
NET PROFIT	**(19,674,338)**	**6,396,886**	**17,946,576**	**18,959,776**	**35,751,033**	**45,353,910**	**53,967,114**	**71,950,772**	**91,564,164**	**99,219,723**	**94,268,081**	**85,943,572**

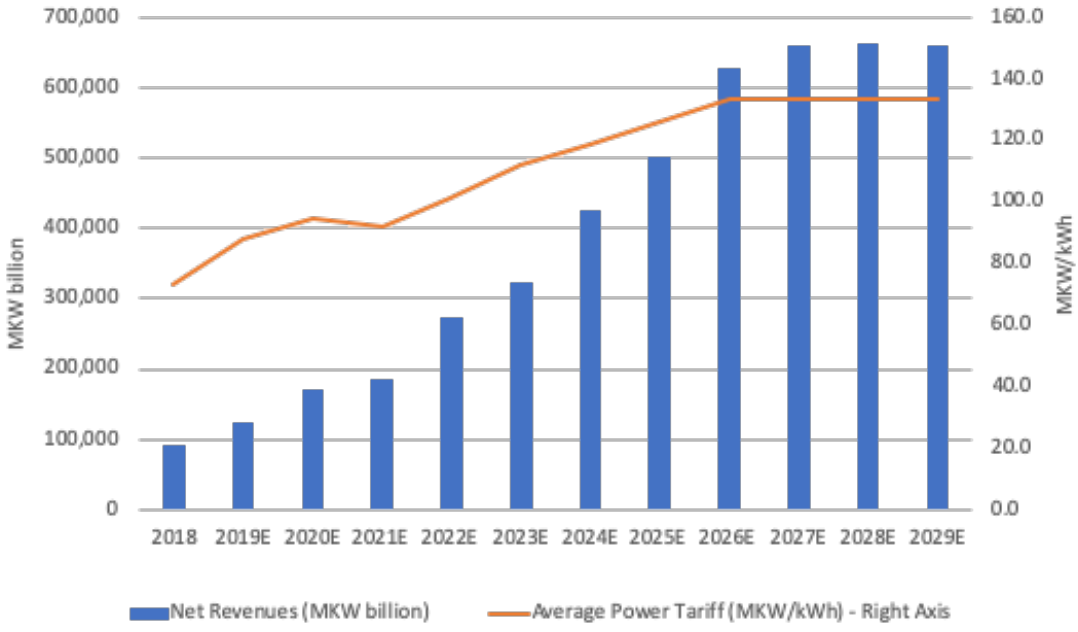
Table 5.20. ESCOM Projected Cash Flow Statement

(MWK '000)	2018	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E
CASH FLOW	**(7,130,574)**	**12,297,008**	**25,147,968**	**28,121,877**	**46,512,305**	**57,353,015**	**67,164,053**	**86,345,544**	**107,156,770**	**116,060,162**	**112,356,353**	**105,279,677**
Change in Net Working Capital	23,298,553	(7,265,959)	(28,915,693)	(3,958,970)	(8,405,944)	(21,231,083)	(20,917,312)	(28,967,557)	(41,766,505)	(42,026,905)	(28,915,945)	(27,716,273)
CASH FLOW FROM OPERATIONS (CFO)	**16,167,979**	**5,031,049**	**(3,767,725)**	**24,162,908**	**38,106,361**	**36,121,932**	**46,246,741**	**57,377,987**	**65,390,265**	**74,033,256**	**83,440,408**	**77,563,404**
(-) Capex	(61,950,754)	(8,925,000)	(36,875,000)	(58,750,000)	(44,282,500)	(29,825,000)	(28,825,000)	(28,825,000)	(28,825,000)	(29,225,000)	(29,225,000)	(29,225,000)
FREE CASH FLOW AFTER INVESTMENTS (FCFF)	**(45,782,776)**	**(3,893,951)**	**(40,642,725)**	**(34,587,092)**	**(6,176,139)**	**6,296,932**	**17,421,741**	**28,552,987**	**36,565,265**	**44,808,256**	**54,215,408**	**48,338,404**
Free Cash Flow Generation	**(810,079)**	**1,285,417**	**22,025,983**	**766,149**	**1,445,007**	**1,611,867**	**3,602,610**	**3,547,696**	**4,078,456**	**3,184,986**	**9,422,831**	**5,416,478**
NET CASH	**5,505,295**	**6,790,712**	**28,816,696**	**29,582,845**	**31,027,851**	**32,639,719**	**36,242,329**	**39,790,025**	**43,868,481**	**47,053,467**	**56,476,298**	**61,892,777**

Table 5.21. ESCOM Projected Balance Sheet highlights

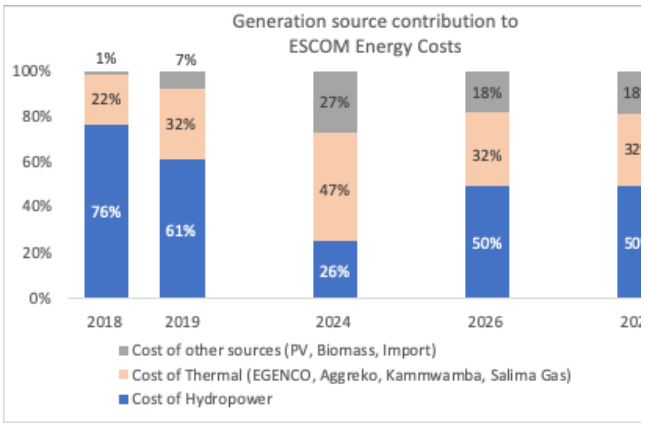
(MWK '000)	2018	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E
(+) Short Term Debt	0	831,011	5,301,628	6,439,518	8,752,785	10,410,643	4,437,978	3,470,243	6,278,926	6,803,570	7,335,180	7,873,888
(+) Long Term Debt	29,923,340	26,642,632	79,899,477	113,793,459	126,685,248	134,642,739	144,937,837	142,607,379	136,386,366	131,215,901	125,943,827	120,567,581
(-) Cash	5,507,699	6,790,712	28,816,696	29,582,845	31,027,851	32,639,719	36,242,329	39,790,025	43,868,481	47,053,467	56,476,298	61,892,777
= Net Financial Position	**24,415,641**	**20,682,931**	**56,384,410**	**90,650,133**	**104,410,182**	**112,413,663**	**113,133,486**	**106,287,597**	**98,796,811**	**90,966,004**	**76,802,709**	**66,548,693**
Equity	**24,352,742**	**28,190,874**	**38,958,819**	**50,334,685**	**71,785,305**	**98,997,651**	**131,377,919**	**174,548,383**	**229,486,881**	**289,018,715**	**345,579,564**	**397,145,707**

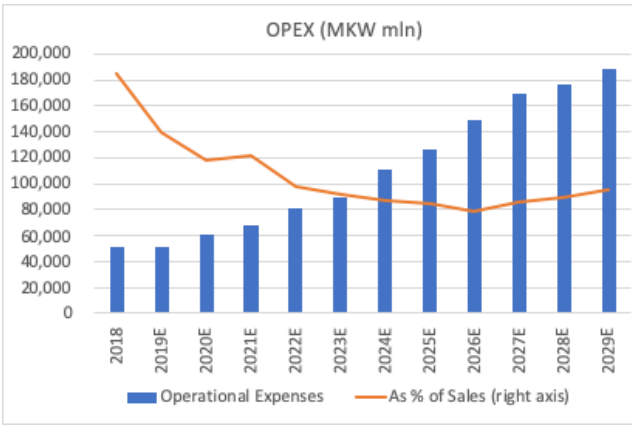
Figure 5.4. ESCOM Net Revenues and Average Power Tariff



78. During the analyzed period, net operating profit (EBIT) and cash flow for the utility are expected to benefit not only from the expanding revenue base boosted by additional power sales and increasing tariffs but also from a better energy mix with increasing contribution from less expensive generation sources compared to Aggreko and EGENCO thermal power plants and improved cost efficiency. In particular, OPEX as a percentage of sales is projected to drop from 56 percent in 2018 to around 25 - 30 percent toward the end of the projected period, still assuming growing maintenance costs due to the expanding kilometers of network. Consumption of goods and services should stand at an average of 13 percent of net revenues for FY19 – FY29 compared to 22 percent at the end of 2018.

Figure 5.5. ESCOM Energy Costs and Operating Expenses





79. Severely constrained investments are expected for 2019 due to the expected slowdown in cash flow generation. However, ESCOM's investment plan for the following 10 years is significant, as shown in figure 5.6.

The increasing CAPEX is going to be financed through additional long-term borrowing and a portion through grants (in particular, for Mozambique-Malawi interconnector). No new loan is expected after 2025, as the capex required to fund the electrification program is expected to be sourced from ESCOM's own cash flow generation, owing both to the Government-supported liquidity enhancement (through new effective tariff reforms) and better operating management (that is cost containment, timely payments for energy purchases, and revenue collections).

Figure 5.6. ESCOM Investment Plan (MWK, millions)

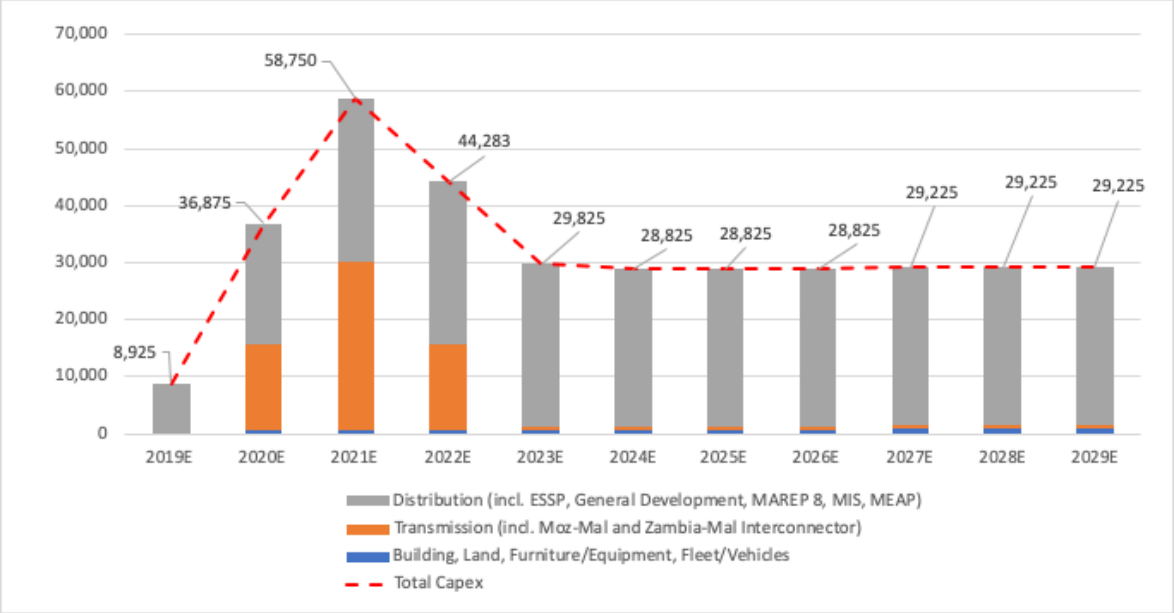
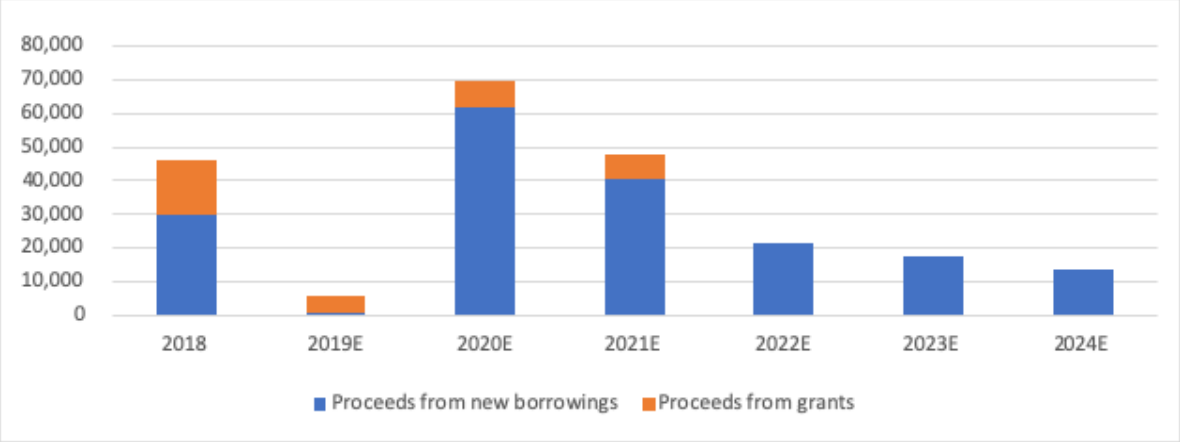


Figure 5.7. ESCOM Capital Injections (MWK, millions)



80. Net working capital would still be an issue for ESCOM during FY19, for a number of reasons: First, it is estimated that trade receivables related to electricity bills have been dramatically increasing, from around MWK 19 billion at the end of 2018 to over MWK 40 billion by FY19; in parallel, other receivables have been similarly increasing throughout the fiscal year, from MWK 18.6 billion in FY18 to around MWK 30 billion expected at the end of the current year. This trend is currently draining cash resources for ESCOM, as a significant portion of its electricity revenues during the year have been in the form of accounts receivable balance rather than cash. In

addition, ESCOM has incurred high trade payables related to arrears with EGENCO and MWK 30 billion backlog in payments for Aggreko power purchases. Going forward, working capital management is projected to improve owing to a better integration of the MIS into ESCOM's billing system and increasing cash flow generation, which should help reduce days payables.

81. This scale-up in capital spending will increasingly place a significant burden on ESCOM's borrowing capacity and debt service obligations, especially during FY21 and FY22, when investments are peaking and despite the significant loan disbursement (figure 5.7). However, FCF generation should remain positive along the projected period, despite the repayment of expensive debt, such as the NBS Bank loan (to cover Aggreko power purchases and replenish increasing trade payables), owing to a better net working capital management and partial repayment of Government arrears.

82. If adequate tariff adjustments for the new regulatory period starting in October 2022 are not approved, ESCOM will be unable to operate on a day-to-day basis and repay its financial obligations. In addition, following the disbursement of the MEAP proceeds, ESCOM will not have sufficient cash to fund its electrification program (90,000 connections annually) to meet the Government's 30 percent electrification target through internal cash generation alone.

Analysis of ESCOM Projected Financial Ratios

83. Following the deterioration in ESCOM's financial and operating performance in FY18, profitability is expected to improve significantly during the projected period (see table 5.22). In particular, EBIT margin is expected to increase from a negative 16.7 percent in 2018 to 5.5 percent in FY19, supported by strict OPEX cost controls, increase in revenues resulting from higher power tariffs, and larger power supplies. Similarly, ROI and ROE are expected to recover well from poor levels in 2018.

Table 5.22. ESCOM projected Profitability Ratios (%)

	2018	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E
EBITDA Margin	-13.8	10.3	21.6	21.7	23.7	24.5	21.6	23.7	23.7	24.5	23.6	22.0
EBIT Margin	-16.7	5.5	17.4	16.8	19.8	20.8	18.5	20.8	21.3	22.0	20.8	19.1
Net Profit Margin	-21.1	5.2	10.5	10.2	13.0	14.0	12.7	14.4	14.6	15.0	14.2	13.0
ROI	-13.2	5.4	16.2	13.1	19.5	21.1	22.1	26.1	29.5	28.6	25.2	21.5
ROE	-80.8	22.7	46.1	37.7	49.8	45.8	41.1	41.2	39.9	34.3	27.3	21.6
ROA	-10.7	2.9	4.6	4.2	7.3	8.5	8.7	10.3	11.2	11.5	10.6	9.5

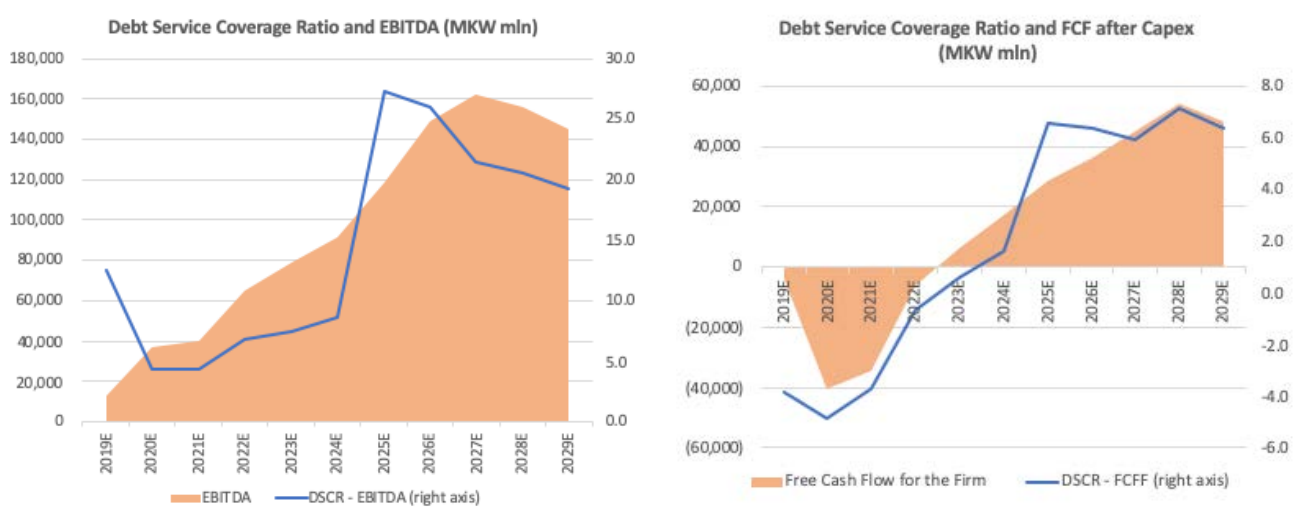
84. Due to the expected improved operating performance, all liquidity ratios are expected to increase over the projection years (see table 5.23): in particular, the ICR is expected to remain at high levels, due to the proposed relatively low interest rates of ESCOM's outstanding debt. Quick and current ratios, which measure the ability of a company to meet its short-term financial obligations, are expected to remain well above the 1x threshold for the projected years.

Table 5.23. ESCOM projected Liquidity and Leverage Ratios

	2018	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E
ICR	-63.2	21.4	7.3	7.7	16.3	26.2	58.1	82.1	48.1	42.7	41.9	39.6
Current Ratio	1.0	1.1	1.6	1.6	1.4	1.5	1.5	1.6	1.6	1.8	2.1	2.3
Quick Ratio (Acid Test)	0.7	0.8	1.2	1.3	1.1	1.1	1.2	1.2	1.2	1.4	1.5	1.7
Gearing (Net Debt / Equity) (%)	100	73	145	180	145	114	86	61	43	31	22	17
Net Debt on FCF	-30.1	16.1	2.6	118.3	72.3	69.7	31.4	30.0	24.2	28.6	8.2	12.3
DSCR (on EBITDA)	-25.6	12.6	4.4	4.3	6.8	7.4	8.6	27.2	26.0	21.4	20.6	19.2
DSCR (on FCF after Capex)	-91.1	-3.9	-4.8	-3.7	-0.6	0.6	1.6	6.6	6.4	5.9	7.2	6.4

85. ESCOM's capital structure and leverage are expected to be increasingly solid over the next 10 years, with net debt on total equity shrinking gradually, and in line with the reduction of long-term borrowings and widening cash position. The DSCR is projected to be well above the 1.0x covenant threshold and to reach high levels beyond FY25, due to a combination of a reduction in total financial debt, an increase in EBITDA owing to additional power supply and higher power tariffs which are expected to be approved for the second regulatory period, and optimized cost structure. In particular, total interest charges and capital share to be repaid on a yearly basis are going to be between MWK 8 billion and MWK 10 billion per year, compared to an EBITDA of over MWK 145 billion in FY29 from around MWK 12 billion in FY19.

Figure 5.8. DSCR on EBITDA and on FCF after Capex



ANNEX 6: Project Map

COUNTRY: Africa
Mozambique - Malawi Regional Interconnector Project