AFRICAN DEVELOPMENT FUND

ETHIOPIA

ADDIS ABABA TRANSMISSION AND DISTRIBUTION SYSTEM REHABILITATION AND UPGRADING PROJECT (AATDRUP)

RDGE/PESD DEPARTMENTS

November 2017

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CURRENCY EQUIVALENTS

As of March 2017

1 UA	=	1.35387 USD
1 UA	=	30.6666 ETB
1 USD	=	22.65073 ETB
1 ETB	=	100 (Ethiopian cents)

FISCAL YEAR

July 8th – July 7th

WEIGHTS AND MEASURES

1 metric ton	=	2,204 pounds (lbs)
1 metre (m)	=	3.28 feet (ft)
1 kilometre (km)	=	0.62 mile
1 hectare (ha)	=	2.471 acres
1 kilovolt (kV)	=	1,000 volts
1 kilowatt (kW)	=	1,000 watts
1 megawatt (MW)	=	1,000 kW
1 gigawatt (GW)	=	1,000 MW
1 kilowatt hour (kWh)	=	1,000 watt hour
1 gigawatt hour (GWh)	=	1,000,000 kWh

ACRONYMS AND ABBREVIATIONS

AA	=	Addis Ababa
AATDRUP	=	Addis Ababa Transmission & Distribution System Rehabilitation and Upgrading Project
AADMP	=	Addis Ababa Distribution Master Plan
AfDB	=	African Development Bank Group
ADF	=	African Development Fund
COET	=	Country Office in Ethiopia
CIFRA	=	Country Integrated Fiduciary Risk Assessment
CSP	=	Country Strategy Paper
DAG	=	Development Assistance Group
DPs	=	Development Partners
EEPCO	=	Ethiopian Electric Power Corporation
EEP	=	Ethiopian Electric Power
EEU	=	Ethiopia Electric Utility
EPA	=	Environmental Protection Agency
EIRR	=	Economic Internal Rate of Return
ENPV	=	Economic Net Present Value
ESIA	=	Environmental and Social Impact Assessment
ESMP	=	Environmental and Social Management Plan
FE	=	Foreign Exchange
FIRR	=	Financial Internal Rate of Return
FNPV	=	Financial Net Present Value
GoE	=	Government of the Federal Democratic Republic of Ethiopia
GDP	=	Gross Domestic Product
GIS	=	Gas Insulated Switchgear
GTP	=	Growth & Transformation Plan
HV	=	High Voltage
HVTL	=	High Voltage Transmission Line
JICA	=	Japanese International Cooperation Agency
LC	=	Local Cost
LRMCS	=	Long Run Marginal Cost of Supply
LV	=	Low Voltage
MoFEC	=	Ministry of Finance & Economic Cooperation
MoWIE	=	Ministry of Water, Irrigation and Electricity
MV	=	Medium Voltage
O&M	=	Operation and Maintenance
p.a.	=	Per Annum
PAPs	=	Project Affected Persons
PFM	=	Public Financial Management
PIT	=	Project Implementation Team
QPR	=	Quarterly Progress Report
RAP	=	Resettlement Action Plan
UA	=	Unit of Account
USD	=	United States Dollars

PROJECT INFORMATION SHEET

CLIENT'S INFORMATION	
Borrower	▪ The Federal Democratic Republic of Ethiopia
Executing Agency	▪ Ethiopian Electric Power (EEP) ▪ Ethiopian Electric Utility (EEU)

FINANCIAL PLAN			
Sources		**Amount (UA million)**	**Instrument**
ADF	Loan	61.41	ADF loan
	Grant	10.82	ADF Grant
Sub Total ADF		**72.23**	
JICA / ACFA		**66.95**	**ACFA Loan**
GOVERNMENT		**15.21**	**Counterpart fund**
TOTAL COST		**154.39**	

ADF's KEY FINANCIAL INFORMATION (Loan)	
Loan currency	Unit of Account
Commitment fee*	0.50%
Service Charge	0.75%
Other fees*	N.A
Tenor	40 years
Grace period	10 years

KEY FINANCIAL AND ECONOMIC OUTCOMES				
	FIRR	FNPV @ 3%	EIRR	ENPV@ 12%
The Proposed Project	6% (real)	US$ 214 million	31% (real)	US$ 857 million

TIMEFRAME – MAIN MILESTONES (expected)	
Concept Note Approval	February 2017
Project Appraisal	March 2017
Project approval	November 2017
Loan Effectiveness	February 2018
Disbursement closing date	December 2024
Project Completion	December 2023
Last repayment	December 2057

PROJECT SUMMARY

Project Overview

The Addis Ababa Transmission & Distribution System Rehabilitation and Upgrading Project (AATDRUP) entails the rehabilitation and upgrading (in the short to medium term) of the transmission and distribution networks in the capital city of Ethiopia, Addis Ababa, and its surrounding urban areas within a 50-km radius situated in the Oromia Regional State and serving a population of about 5.0 million people. Addis Ababa and its environs are in the central part of the country and account for the largest load centre (approximately 60% of overall country demand). The project also includes a component for the improvement of the distribution network for the nearby urban towns in Oromia Region in line with the Government's strategy of broad based growth and poverty reduction and improving the efficiency of service provision. This is expected to contribute to inclusive economic transformation.

The expected outcomes of this project will include: (i) increased electricity supply capacity, (ii) improved quality and reliability of electricity supply to households, enterprises, social services as well as government facilities in Addis Ababa, and (iv) a reduction in system losses thereby improving the financial performance of the power utilities. This will also contribute to improve electricity access rates and living conditions for the urban population. The project will cost UA 154.39 million (USD 209.03 million) and will be financed by an ADF loan of UA 61.41 million, an ADF grant of UA 10.82 million, a JICA / ACFA loan of UA 66.95 million (USD 90 million) and Government of Ethiopia (GoE) contribution equivalent to UA 15.21 million.

Needs Assessment

The main economic activities in the project area are industries, commercial enterprises, transport system, housing development and public services. The project area also hosts new industrial parks constructed to improve the textile, garment and agro-industry production sectors, for employment creation and exports. The electricity supply situation in the project area is characterized by the lack of adequate transmission and distribution capacity (the new customer connection backlog is close to 20,000), low quality of electric supply, frequent supply interruptions (an average of 2.3 transient faults and 1.6 permanent MV feeder faults/km/year) and significant power losses (technical power loss in MV network estimated to be 6.1%). Improvements in the transmission and distribution network will ease the capacity shortages, improve the quality and reliability of electric supply, facilitate connection of additional customers to the grid, and increase connectivity through reduction of the connection backlog.

Bank's Added Value

The project is in line with the Bank's Ten-Year Strategy (TYS) 2013-2022 dual objectives of green and inclusive growth as well as the five core operational priorities, in particular, infrastructure development. The project is also consistent with the High 5 strategic priorities, notably Light-Up and Power Africa and New Deal for Energy in Africa that aims to achieve one of the four targets: increase on-grid transmission and grid connections that will create 130 million new connections by 2025. The TYS and High 5s seek to accelerate Africa's transformation through improvements in power infrastructure, stimulating industrialization, SME businesses and social infrastructure development. The project is also consistent with the Bank's Country Strategy Paper (CSP) 2016-20

for Ethiopia, particularly pillar I which focuses on transport, energy, and water and sanitation infrastructure development. By reducing the costs of doing business through improved access to affordable and reliable energy supply, the project will stimulate private sector development. Therefore, the project is also aligned with pillar II of the CSP (promoting economic governance) which emphasizes improving the enabling environment for private sector development.

The Growth & Transformation Plan II (GTP-II) 2015/16-2019/20) identifies infrastructure development as a key vehicle for sustainable economic transformation. The total investment outlays for GTP II amount to USD 119.5.0 billion, of which, infrastructure development is estimated to cost USD 35.9 billion. Under energy infrastructure development, the Government projects increasing the generation capacity by 13,000 MW and constructing 5,710 km and 106,734km of transmission and distribution lines, respectively. The Government has demonstrated its commitment to continue to cover 100% of budget requirements for the local component and compensation costs from its own resources. However, it requires assistance from Development Partners (DP) to cover the financing needs for the foreign component of projects. In this respect, the Bank, being the third largest DP in the energy sector in Ethiopia, is well positioned to continue making a strategic contribution to the sector. The Bank's investment through this project will target the central and various parts of the country where similar electricity supply infrastructure improvement projects have been successfully implemented.

Knowledge Management

The proposed project is a product of 2015/16 Addis Ababa Distribution Master Plan (AADMP) Study financed by the Bank, which among other things, recommended the implementation of: (i) a short and medium term program for refurbishment, upgrading and expansion of the transmission and distribution network required to meet the rapidly growing electricity demand, whilst ensuring acceptable quality and reliability of supply to the capital city and its environs, and (ii) a Distribution Business Improvement Plan, with emphasis on business improvement in the form of human resource development, training facilities and tools, adoption of new technology, and distribution monitoring and maintenance plans. In addition, the Bank's Energy Sector flagship study highlighted importance of capacity development programs and deepen sector reform to improve operational efficiency.

The project will also support the implementation of the Supervisory Control and Data Acquisition System (SCADA) in the Addis Ababa distribution network that will enhance the management of the operation and maintenance activities and significantly improve the skill of the Ethiopia Electric Utility (EEU) staff. Furthermore, the project will include a capacity building and technical assistance program to improve EEU and Ethiopian Electric Power (EEP) staff competencies in project preparation (Feasibility, Environmental and Social Impact Assessment/Resettlement Action Plan-ESIA/RAP studies), engineering design, and operation and maintenance planning.

RESULTS-BASED LOGICAL FRAMEWORK

Country and Project Name: Ethiopian - Addis Ababa Transmission and Distribution System Rehabilitation & Upgrading Project

Purpose of the project: to rehabilitate and upgrade the existing electricity transmission and distribution infrastructure in capital city and nearby urban towns to improve quality and reliability of electricity supply and enhance the network power transfer capacity.

RESULTS CHAIN		PERFORMANCE INDICATORS			MEANS OF VERIFICATION	RISKS/MITIGATION MEASURES
		Indicator (incl. CSI)	Baseline 2016	Target 2020		
IMPACT	1. Improved access to and quality of energy infrastructure services for the private sector and citizens to sustain rapid, green and inclusive growth	1.1.Increased number of consumers with access to electricity (in millions)	2.45	6.95	EEP & EEU annual reports; Government Statistics and Bulletins; Central Statistics Agency, UNDP Human Development	
		1.2. Increased population with electricity service coverage (population reached with medium voltage lines)	57%	90%		
OUTCOME	1. Improved business and operational performance of Addis Ababa power distribution system	1.1 Additional revenue collected by the EEU $M through additional customer connections,	n/a	169.4	- EEP annual report - Utility records	Risk: Shortage of financing resources & low level of tariff could impact system development and quality of service delivery. Mitigation: Government support to financing, transmission and distribution components and undertaking tariff revision studies to gradually increase the tariff to cost reflective level Risk: Project execution delays & complexity of implementing the rehabilitation and upgrading projects on the existing Installations in a densely-populated city. Mitigation: Executing Agency will assign a dedicated team to assist & follow-up on timely project implementation in the existing installations and rigorous consultations with stakeholders. Include a communications Expert in PIU and possibly for the consultant as well.
		1.2. Reduce the power loss in the Addis Ababa area and its environs MV distribution network (%)	6.1	2.7		
		1.3. Reduce power interruption (faults/km/year) - Permanent - Transient	 1.6 2.3	 0.85 1.2		
	2. Increased Electricity Supply and connection of additional new customers in Addis Ababa and environs (domestic, commercial, industrial, public, and private businesses)	2.1. Additional energy delivered to the city due to the project (GWh) 2.2. Additional customers connected in the Addis Ababa area because of project implementation, 2.3. % of vulnerable HH	n/a n/a n/a	2,824 432,000 10%		
OUTPUT	**Component A** -Construction (Rehabilitation & upgrading) of Medium Voltage (MV) & Low Voltage (LV) Distribution Network - SCADA system	Additional MV & LV distribution lines constructed for Addis Ababa area, km, -MV lines -LV lines -Established SCADA	 - - 	 479 494 1	Project Progress & Completion Reports	**Risk:** Delays in the procurement process **Mitigation:** - Use of Advance contracting and timely no objection by the Bank and consultant support to the PIT. - EEP/EEU have adequate procurement capacity & experience in implementing the rehabilitation and upgrading project.
	Component B	Additional Length of HV line constructed for Addis Ababa area, (km)	-	3.8		

	- Construction of high voltage transmission line - Construction (Rehabilitation & upgrading) of Substations	New HV substations constructed and upgraded for Addis Ababa area, (No.)	-	9	
	Component C - Services Project Supervision and Management and Capacity building & Technical assistance	Supervision Consultant appointed	-	12 project quarterly reports	**Risk:** Delays in recruitment of the consultant **Mitigation:** Use of Advance contracting and timely no objection by the Bank
		Number of staff trained within the EEP& EEU % of women trained	- -	30 30%	**Risk**: Planning of appropriate training program **Mitigation:** The consultant will conduct need assessment for EEP and EEU.
	Component D Implementation of RAP/ESMP	Number of jobs created -Men -Women - Number of people compensated - Number of people trained on safety	 - - - -	 800 240 55 15 (40% are women)	**Risk:** Displacement and land acquisition, and intrusion on cultural heritage sites such as churches, mosques, burial places, schools, clinics/hospital, archaeological and historical sites and away from any sites of outstanding natural beauty. **Mitigation:** This will be minimized through a judicious selection of technical options and routes for lines and ensuring flexibility in the positioning of transmission towers to minimize intrusion and visual impact on cultural heritage sites. **Risk**: Inadequate stakeholder participation during project implementation. **Mitigation:** EEP and the Government have conducted a thorough consultative process that received strong stakeholders' support. Consultations with stakeholders will continue into the implementation stage.

KEY ACTIVITIES

COMPONENTS

Components	Cost (UA million)
A - Distribution Networks	58.59
B – Transmissions & Substations	75.61
C- Services	13.86
D – Implementation of RAP & ESMP	6.34
___ Total	**154.39**

INPUTS

Source of Funding		Amount (UA million)
ADF	**Loan**	**61.41**
	Grant	**10.82**
JICA		**66.95**
GoE.		**15.21**
Total		**154.39**

REPORT AND RECOMMENDATION OF THE MANAGEMENT TO THE BOARD OF DIRECTORS ON PROPOSED FINANCING TO ETHIOPIA FOR ADDIS ABABA TRANSMISSION & DISTRIBUTION SYSTEM REHABILITATION AND UPGRADING PROJECT

Management submits the following Report and Recommendation on proposed ADF loan and grant totaling UA 72.23 million to finance the Addis Ababa Transmission & Distribution System Rehabilitation and Upgrading Project in Ethiopia.

I. STRATEGIC THRUST & RATIONALE

1.1 Project linkages with country strategy and objectives

1.1.1 The 2015/16 Addis Ababa Distribution Master Plan (AADMP) Study funded by the Bank reveals that physical infrastructure in Addis Ababa are required. However, these improvements need to be augmented with the strengthening of organizational and operational capacities at the power utilities EEP and EEU. A key outcome of the AADMP study was the development of a Business Improvement Plan to holistically address the identified power sector challenges. The key actions in the master plan aim to: (a) integrate its investments in infrastructure with economic activities to create proper electricity supply network and improve service delivery, (b) standardize network planning and coordinate development of transmission and distribution investment plans, (c) co-ordinate the delivery program focused on network enhancement and replacement, (d) develop a loss reduction (technical and non-technical) action plan to ensure competitiveness and maximize revenue, and (e) enhance operational practices related to the management of the network and improved asset selection and management.

1.1.2 Ethiopia's Growth and Transformation Plan II (GTP-II) 2015/16 – 2019/20 outlines equitable and inclusive development and envision the achievement of universal electricity access by 2025 a target to become middle income country. The Government of Ethiopia's (GoE) key development objective, as articulated in GTP-II is to achieve inclusive, accelerated and sustained economic growth and to eradicate poverty. Energy is one of the nine priority sectors in the GTP II. The sector is underpinned by sound policy, legal and strategic framework which includes the National Energy Policy (1994), Energy Proclamation No. 810/2013[1], the Climate-Resilient Green Economy (CRGE) Strategy (2011) and the 25-year Power Development Master Plan adopted in 2014, which describes the national strategy and action plan for achieving the national electricity access and energy sector development targets.

1.1.3 The proposed project is consistent with this strategic and legal framework as it seeks to increase access to reliable and affordable electricity, and thereby contribute to sustainable economic transformation. One of the key GTP II objectives is to increase the country's generating capacity from 4270 MW to 17,208 MW and electricity service coverage from 57 % to 90%. This is expected to be achieved through the development of the country's hydro power potential[2] as well as of other renewable energy resources (wind, solar, geothermal) and the construction of electric power transmission and distribution infrastructure. GTP II seeks to build on the achievements under GTP I (2010/11 – 2014/15) where generation capacity was increased from 2,000 MW in 2010 to 4,180 MW in 2015, with electricity access coverage increasing from 41% to 60%. However, the national electricity access rate (connectivity) remained low at 21% in 2015, up from 18% in 2010. GTP-II incorporates the achievements and lessons learned under GTP-I, and thus emphasizes the improvement of livelihoods of the urban and rural population by providing sufficient, affordable, and reliable electricity supply. The proposed project is thus consistent with the Government's

[1] Federal Government Gazette, A Proclamation on Energy, Proclamation No. 810/2013, Jan 27, 2014

[2] estimated at over 45,000 MW but developed at less than 10% of this potential capacity to date

emphasis on improving the energy sector infrastructure and services.

1.1.4 The Bank's Country Strategy Paper (CSP) 2016-2020 for Ethiopia aligns with and supports the realization of the GTP II objectives. The CSP focuses on infrastructure development, especially energy, transport, and water and sanitation under pillar I and promoting economic governance, under pillar II. Pillar II of the CSP places emphasis on facilitating effective and efficient delivery of basic services and business enabling environment for private sector development. The proposed project thus is in line with the Bank CSP 2016-2020 as well as the Government's GTP-II and contributes to the two CSP pillars, directly by improving energy infrastructure under pillar I and indirectly by reducing the costs of doing business, and thereby improving the enabling environment for private sector development. The proposed project's focus on increasing access to reliable and affordable energy supply from renewable sources is also consistent with the Bank's Ten-Year Strategy (TYS) 2013-20), with its dual objectives of inclusive and green growth, and core operational priority of infrastructure development.

1.1.5 Successful implementation of the project will support the High 5 strategic priorities, which are designed to accelerate the realization of the TYS. While the project is directly aligned with the Light-Up and Power Africa High 5 priority, access to affordable energy will also support the other High 5s, notably Feed Africa, Industrialize Africa and Improve the Quality of Life for the People of Africa, especially since energy is a key enabler for agricultural development, industrialization and employment creation. For instance, the project will directly improve livelihoods for an estimated 432,000 new customers in the capital city and its environs. The project is also aligned with the Bank Gender Strategy (2014 – 2018), especially since the availability of reliable and affordable electricity supply will open up new economic opportunities for women and men. Stable electricity is also expected to increase industrial productivity and create more jobs including among the youth.

1.1.6 Overall, the proposed project will contribute to: (i) improving the electricity transmission and distribution infrastructure; (ii) meet the growing electricity demand in the capital city Addis Ababa and its environs; and (iii) replace the power system infrastructure to reduce energy losses and remove overloads, hence improving the quality of electricity supply. The increased electricity coverage and reliability will also expand supply for the light rail transport system and auxiliary services such as mobile telephony and ICT, which are currently negatively affected by power supply interruption. . The project is also aligned with the Sustainable Development Goals (SDG), particularly SDG 7 on "ensuring access to affordable, reliable, sustainable and modern energy for all by 2030".

1.2 Rationale for Bank's involvement

The proposed project has been requested by the GoE and is justified in view of the following:

1.2.1 Ethiopia has made significant improvements during the last decade to 2015 in terms of increasing access to electricity and basic services, according to the Ministry of Finance and Economic Development (MoFEC) annual report.[3] The country's objective to meet its average real GDP growth target of 10% per year and to increase the rate of the population with electricity service coverage from 57% in 2016 to 90% by 2020 will be realised by focusing on grid-based rural electrification, off-grid supply options, the development of adequate transmission, and distribution systems for power transfer to various parts of the country and distribution of electricity supply to cities. The proposed project will be critical to meeting sufficient power transfer capacity, by evacuating 735 MW by 2016 and 1,168 MW by 2020 from the national grid. This will meet the growing industrial, commercial, and domestic demand in the capital city

[3] Population Access to Electricity (Service coverage) has been improved from 17% (2005) to 55% (2015)

Addis Ababa and surrounding towns, and increase EEU's revenue by an estimated USD 169.4 million by year 2020 from energy sales to new customers.

1.2.2 By increasing access to electricity services, the proposed project will reduce the costs and inconvenience associated with using substitute forms of energy, such as diesel powered micro-solutions. Frequent power outages force both households and businesses to switch to expensive diesel generators supply whose approximate cost of energy reaches up to 40 US cents/kwh, kerosene lighting and candles. These substitutes entail additional expenses and risks, including health related hazards, to the users and adverse environmental impacts. Businesses, particularly Small and Medium Enterprises (SMEs) which cannot afford stand-by diesel generators, are often forced to close during power disruptions, resulting in lost production while still incurring cost of labour and overheads.

1.2.3 The proposed project consolidates the achievement of recently completed Rural Electrification phase-II (RE-II) and Ethiopia Transmission Systems Improvement (ETSIP) projects, which addressed similar challenges in improving and expanding the electricity power transmission and distribution network capacity and enhancing customers' connectivity. Achievements were registered to increase transmission capacity by 860 MW, electrified 285 rural towns to create access and connected 11,910 new customers in rural & semi-urban areas.

1.3 Donor Coordination

1.3.1 Donor coordination activities in Ethiopia are strong and co-led by the Government and lead donor agencies. Policy dialogue and coordination activities are undertaken within the framework of the Development Assistance Group (DAG), which is the highest-level coordination forum in Ethiopia for activities of Development Partners (DPs) providing assistance within the Paris Declaration and Busan principles. The DAG comprises 30 multinational and bilateral DPs and seeks to enhance the delivery and effectiveness of development assistance to Ethiopia. The DAG is supported by Sector and Technical Working Groups and provides a coordination and harmonization framework for DPs to support the GoE in formulating policies and strategies and monitoring their implementation. The Bank is a core member of the DAG and was co-chair during the period July 2015 – July 2016. The Bank actively participates in several thematic and Sector Working Groups including, transport, energy, agriculture, water and sanitation, education, social protection, gender, public financial management (PFM) and private sector development. Coordination in energy sector has recently been strengthened with the establishment of an Energy Sub-Sector Working Group, under the Water and Energy Sector Working Group (SWG). The Bank is currently working with other energy sector DPs to develop Terms of Reference and other organizational processes to improve coordination and harmonization in the energy sub-SWG. There is active sharing of information and harmonization of energy sector DPs' positions on key sector issues with a view to promoting the long-term viability of the sector.

1.3.2 The most active energy sector DPs include: The African Development Bank, the World Bank (WB), the Japanese International Cooperation Agency (JICA), the French Development Agency (AfD), the European Investment Bank (EIB), the Arab Bank for African Economic Development (BADEA), the Kuwait Fund, India, China, and Italy. The DPs are mainly involved in supporting projects aimed at: (a) helping the country establish a sustainable program for expanding the access to electricity, and to improve the quality of electricity supply; (b) increasing the efficiency and sustainability of Ethiopia's power sector; (c) accelerating Universal Electricity Access Program (UEAP); (d) developing hydro generation capacity and renewable energy mix; (e) rehabilitation of the urban distribution system; (f) rehabilitation and upgrading of transmission network and substations (g) development of geothermal power resources (for details see Appendix-III and Technical Annex Table A1.3)

II. PROJECT DESCRIPTION

2.1 Project components

Table 2.1: Project Components

No.	Component Name	Est. cost (UA mil.)	Component description
A	**Distribution Networks** **A.1**- Upgrading and Rehabilitation of MV feeders and construction of new 33/15 kV primary substations	8.42	**Urgent Rehabilitation of Distribution Network** – Rehabilitation of 280 km of MV lines, replacement of 280 distribution transformers and installation of four 33/15 kV primary substations.
	A.2 - Construction of new medium voltage lines and replacement of 45kV substations.	17.45	Upgrading of the Distribution Network (**Short- and Medium-Term) -** Construction of 265 km of MV lines, installation of 22 distribution transformers and one 45/33/15 kV and nine 33/15 kV primary substations
	A.3 - Rehabilitation of Medium and Low voltage network	17.28	**Project (phase II rehabilitation Program)** - Rehabilitation of 215 km of Medium Voltage lines, 512 distribution transformers and 500 km of low-voltage lines.
	A.4 SCADA System	15.44	Establishment of the SCADA & telecommunication system for the operation of the Addis Ababa area distribution network
B	**Transmissions &Substations** **B.1** - Upgrading of existing 11 substations and construction of 1 double circuit 132 kV line and double circuit underground line	42.49	**Short- and Medium-Term Projects (Substation and Transmission)** - Upgrading of existing 11 substations and construction of one double circuit 132 kV line 3.8 km overhead line and 1.9 km double circuit underground line.
	B.2 - Upgrading of Addis Centre Substation including underground 132 kV lines	33.12	**Short and Medium Term Project (Upgrading of ADC Substation)** - Approximately 16 km of a new double circuit 132 kV underground cable between Addis Centre and Kaliti-I and new 132/33/15 kV GIS substation.
C	**Services** **C.1 -Project Supervision and Management**	13.67	Project supervision & management consultancy services and EEP & EEU project design and management.
	C.2- Capacity building	0.18	To support EEP & EEU building the capacity of their professional staff in the areas of project preparation (Feasibility and ESIA/RAP studies), engineering design and operation and maintenance planning.
D	**Implementation of RAP & ESMP**	6.34	Implementation of mitigation measures and compensation of people affected by the project including the MV distribution component ESMF implementation. The project has been categorized in AfDB environmental and social category I.
Total		**154.39**	

2.2 Technical solution retained and other alternatives explored

2.2.1 The Addis Ababa Distribution Master Plan Study report has identified the needs for refurbishment, rehabilitation and upgrading of the electricity distribution network and proposed different medium voltage network (15kV & 33kV) distribution options based on the length of the lines and the maximum required power transfer. The 15kV and 33kV voltage levels were considered based on the recommendation of the Master Plan Study and because of technical-economic analysis studies done as part of the preparation of the master plan study document.

Table-2.2 Project alternatives considered and reasons for rejection

Alternative name	Brief description	Reasons for rejection
a) Maintain existing equipment,	Maintaining the existing old switchgear equipment and transformers in very poor physical and operational condition	This alternative is not be feasible, since the equipment is in poor physical condition beyond repair, with no spare parts availability and nominal capacity sharply reduced because of aging.
b) Refurbish and Repair existing equipment	Refurbish and repair existing equipment with relatively sound physical/operational condition	This option alternative will only be feasible to bring the capacity to nominal, extending lifespan and improving the service condition of the existing equipment
c) Replace and upgrading of existing equipment	Replacing the existing old switchgear equipment and transformers in poor physical and operational condition	The option will create opportunities to change and upgrade the old equipment, resulting in improving the capacity, quality and reliability of the electricity supply network.
d) A combination of the above listed options c & d	Rehabilitate (refurbish repair, & replace) and upgrade of the existing electricity supply network components	This option will help in addressing all challenges about the poor quality of electricity supply, constraints in power transfer capacity, reliability and higher losses. It considers extension of existing 132 kV supply & alternative 33kV distribution systems to supply electricity to customers.
e) Do nothing' option	Continue with the utilization of the existing transmission and Distribution Network without intervention	These options incur no capital expenditure, but losses and capacity limitation continue to be incurred and can be costed and are not technically acceptable but they help to provide a measure against which the acceptable technical options can be judged.

2.3 Project type

2.3.1 The proposed project is a standalone operation that will be financed through an ADF loan and grant, with a co-financier (JICA).

2.4 Project cost and financing arrangements

2.4.1 The project cost, including physical and price contingencies and excluding all taxes, duties, levies, and VAT in Ethiopia, is estimated at UA 154.39 million (USD 209.02 million), comprising foreign currency costs UA 113.89 million (USD 154.19 million) or 74.0 % and local cost of UA 40.50 million (USD 54.83 million) or 26.0%. The summary of the cost estimates by component, sources of financing and by category of expenditure are shown in table 2.3 below.

Table 2.3: Project Cost Estimates by Component

Component / Lot	Lot No.	FC	LC	Total	FC	LC	Total
		UA million			USD million		
A) Distribution Networks							
A.1) Upgrading and Rehabilitation of MV feeders and construction of new 33/15 kV primary substations	Lot-1	6.12	1.53	7.65	8.29	2.07	10.36
A.2) Construction of new medium voltage lines and replacement of 45kV substations.	Lot-2	12.69	3.17	15.86	17.19	4.30	21.49
A.3) Rehabilitation of Medium and Low voltage network	Lot-5	12.57	3.14	15.71	17.02	4.25	21.27
A.4) SCADA System	Lot-6	12.63	1.40	14.03	17.10	1.90	19.00
B) Transmission Lines & Substations							
B.1) Upgrading of existing eleven substation and construction of one double circuit 132 kV line and One double circuit underground line	Lot3	30.90	7.72	38.62	41.83	10.46	52.29
B.2) Upgrading of Addis Centre Substation including underground 132 kV lines	Lot-4	24.09	6.02	30.11	32.61	8.15	40.77
Sub-total (A + B)		**99.00**	**23.00**	**122.00**	**134.04**	**31.13**	**165.17**

Component / Lot	Lot No.	FC	LC	Total	FC	LC	Total
		UA million			USD million		
Price Contingency 5%		4.95	1.15	6.10	6.70	1.56	8.26
Physical Contingency 5%		4.95	1.15	6.10	6.70	1.56	8.26
Total (A + B)		**108.90**	**25.30**	**134.20**	**147.44**	**34.25**	**181.69**
C) Services							
C.1) Project Supervision and Management		4.80	8.87	13.67	6.50	12.01	18.51
C.2) Capacity building and technical assistance		0.18	-	0.18	0.25		0.25
Sub- Total Services		**4.98**	**8.87**	**13.85**	**6.75**	**12.01**	**18.76**
D) Compensation and resettlement			6.34	6.34		8.58	8.58
Total Project Cost		**113.89**	**40.50**	**154.39**	**154.19**	**54.84**	**209.03**

2.4.2 The Bank will provide an ADF loan (UA 61.41 million) and grant (UA 10.82 million) amounting to UA 72.23 million, which is 46.8% of the total financial requirement, with JICA/ACFA's financing equivalent to UA 66.95 million (representing 43.36%) and the GoE providing UA 15.21 million (9.86%). In addition to the GoE's counterpart funds (9.86% of total project cost), all local taxes for all works, goods and services will be paid by the GoE (See Technical Annex B.2.1).

2.4.3 The sources of financing for the project are illustrated in Table 2.4. The Bank's financing will be used to cover 51.42% of the total foreign cost and 33.75% of local costs of the project excluding all taxes, duties, levies, and VAT in Ethiopia. Table 2.5 illustrates the total project cost by category of expenditure.

Table 2.4: Sources of Financing for Foreign and Local Costs

Sources		UA million			% of total
		FC	LC	Total	
ADF	Loan	50.96	10.45	61.41	46.78%
	Grant	9.14	1.68	10.82	
Sub total		60.10	12.13	72.23	
JICA		55.33	11.62	66.95	43.36%
Government of Ethiopia		-	15.21	15.21	9.86%
Total project cost		***113.89***	***40.5***	***154.39***	***100%***

Table 2.5: Project Cost by Category of Expenditure

Category of expenditure	UA million			% foreign costs
	F/C	L/C	Total	
Works				
Distribution Networks	48.42	10.17	58.59	82.64%
Transmission Lines & Substations	60.49	15.12	75.61	80.01%
Services				
Project Engineering & Supervision	4.80	8.87	13.67	35.11%
Capacity Building and Technical Assistance	0.18	0	0.18	100.00%
Others				
ESMP / ESMF/ RAP Implementation	0.000	6.34	6.34	0%
Total project cost	**113.89**	**40.50**	**154.39**	**76.94%**

2.4.4 The Bank's financing expenditure schedule by component is provided in Table 2.6.

Table 2.6 Financing Expenditure Schedule in million UA (for ADF Financing)

Component	2018	2019	2020	2021	2022	2023
Distribution Networks	0	5.76	19.21	7.68	3.84	1.92
Transmission Lines & Substations	4.49	14.97	5.99	2.99	1.50	-
Project Engineering & Supervision	0.55	1.85	0.74	0.37	0.18	-
Capacity Building and Technical Assistance	0.05	0.13	0	0	0	-
Total	5.09	22.71	25.93	11.05	5.52	1.92
Cumulative (%)	7.1	31.4	35.9	15.3	7.6	2.7

2.4.5 The Bank's financing will be on-lent and/or provided as a grant to EEP and EEU as per the breakdown in Table 2.7.

Table 2.7 Distribution of project funds between EEP and EEU for ADF financing

Executing Agency		In UA			In USD		
		FC	LC	Total	FC	LC	Total
Loan	EEP	25.42	5.99	31.41	34.92	8.11	43.03
	EEU	25.54	4.46	30.00	34.58	6.03	40.61
Sub total		50.96	10.45	61.41	69.5	14.14	83.64
Grant	EEU	9.14	1.68	10.82	11.88	2.28	14.15
Total		60.1	12.13	72.23	81.38	16.42	97.79

2.5 Project's target area and population

2.5.1 The project will cover the capital city Addis Ababa, surrounding towns and Wored as in the Oromia Regional state, with a target population estimated at 5.0 million inhabitants. Addis Ababa and its environs consists of emerging metropolitan cities, which are characterized by high population growth of 3.8%/per annum[4] (p.a) and low quality of basic services, compared to international standards and economic indicators. Therefore, the implementation of the project will significantly improve the socio-economic development and access to basic services of the residents of the targeted area.

2.5.2 The main project beneficiaries will therefore include the power utilities EEP and EEU, residents of the capital city, industries, health & education facilities and commercial businesses which are currently getting limited and unreliable of electricity supply. The project will also contribute to improve and strengthen power supply, hence increasing the supply capacity and reducing system power losses, thereby enabling the supply of affordable and reliable electricity to households, enterprises, social services as well as government facilities. This will contribute to increased electricity access rates, living conditions for the population, business growth and employment creation, and economic growth.

2.6 Public Participatory process for project identification, design & implementation

2.6.1 Public participation in identification was embedded in the Government's annual budget programming process. In line with the National Energy Policy, which emphasizes the need for the development of indigenous resources, Ethiopia has started to aggressively develop its immense hydro power and renewable energy potential, both for internal consumption and export. The energy generated at the remote hydro sites must be evacuated and distributed to the load centers through high voltage transmission & distribution networks.

2.6.2 At design and preparation stage, views of the various stakeholders were captured through meetings and workshops carried out as part of the ESIA, Environmental and Social Management Plan (ESMP) and RAP studies. The main objective was to ensure all issues concerning the proposed project were covered. Consultations included stakeholders in relevant government ministries and city administrative offices, communities including women and project affected population (PAPs), districts, national and international NGOs and civil society (SCO). Awareness campaigns and participatory assessments such as discussions with local leaders, public village meetings and interviews with focus groups were also held.

2.6.3 Feedback from the consultations have been incorporated into the project design. The key issues raised during the consultations include: land acquisition procedures, compensation in terms of valuation and timeliness for buildings, crops and vegetation, the prospect of increased spread of

[4] As per 2007 Central Statistical Agency (CSA) report

HIV/AIDS, and possibility of connecting new customers in the project area. These issues were resolved through consensus and are reflected in the design of the project. For instance, to improve efficiency in land acquisition, the Right of Way activities have been included in the project as part of the supervision consultancy activities, with due consideration given to transmission line route selection to minimize displacement of peoples and destruction of their properties.

2.6.4 Stakeholders (SCO, private sector, beneficiaries etc...) participation modalities during project implementation will be through involvement and follow-up on the compensation, RAP and ESMP activities, getting required periodical information about the project progress and undertake a visit to construction sites to witness actual accomplishment. Customized skill development and on job training programs will be provided for the local skilled/semiskilled labor during construction period.

2.7 Bank Group experience, lessons reflected in project design

2.7.1 The Bank Group has been a partner of the Ethiopian government in the development of the electricity sub-sector for a long time. Since 1979, the Bank has provided financing for seven projects in the sub-sector for a total amount of UA 588.83 million. The Bank has also been supporting Ethiopia's effort to expand and exchange power with its neighboring countries through financing of multinational projects. Support has been focused on providing finance for the high voltage transmission lines, rural electrification and regional interconnection projects (Appendix-IV). Currently, there are two ongoing projects under the Bank's energy portfolio, namely: Ethiopia-Kenya Electricity Highway and Mekele-Dallol & Semera-Afdera power transmission project for a total financing of UA 226 million. The Ethiopia-Kenya project is expected to be completed in 2019, whereas the conditions for first disbursement have been fulfilled for the Mekele-Dallol & Semera-Afdera power transmission project.

2.7.2 The Bank has 17 ongoing investment operations in Ethiopia with a total value of UA 1.160 billion and the overall performance of the portfolio is highly satisfactory with an average Implementation Progress (IP) rating of 3.14 and Development Objective (DO) of 3.39 (Appendix IV). Key lessons learnt from the AfDB financed on-going projects as well as those supported by other donors were considered in the formulation and design of this project. These include:

(i) The lack of competent project management team at the Executing Agency (EA) coupled with frequent staff turnover has on many occasions delayed project implementation. The project includes capacity building for the Project Implementation Team (PIT) of the EA, and the project will also hire an experienced engineering consultancy firm for project management and supervision works.

(ii) Delays were experienced in submitting procurement plans, bidding documents, evaluation reports and contracts execution. The Bank is continuously conducting training of procurement experts and project management staff in the country to expedite procurement process and project implementation. Also, periodical fiduciary clinics conducted to improve knowledge of project staff of Bank's safeguard rules & procedures.

(iii) As in the case with other similar transmission and distribution projects, where construction works are in dispersed areas, it is more cost effective and time saving to package project activities in lot such that the contractors do not have to move across the cities to access different sites. In this project, proper procurement packaging (in lots) has been designed for transmission lines, substations and distribution construction project components in accordance with the Bank procurement policy and guidelines;

(iv) In the past, implementation agencies did not give due consideration to the follow-up and monitoring of ESMP and RAP implementation. In the proposed project, skilled environmental and social experts will be recruited at the main project office and at the construction sites to support the

implementation of the ESMP and RAP. A communication expert will also be recruited to enhance community relations during project implementation.

(v) Repeated loan saving utilization requests were received from the Government, which in turn has caused project aging due to multiple extensions of the disbursement deadline especially on the Rural Electrification-II project. For the proposed project, a more rigorous cost estimation of various components has been undertaken and will be complemented with close follow-up on project implementation and disbursements. Timely decisions on utilization of potential savings will be made to avoid extended implementation delays.

2.8 Project Readiness Mechanisms

While preparing the project for financing, rigorous readiness mechanisms were implemented. These included prior preparation of environmental studies (ESIA/RAP), application of advance contracting, and preparation of tender documents. These measures are expected to increase project readiness for implementation and ensure timely project start up.

2.9 Key performance indicators

2.9.1 The main deliverables of the project are: (i) construction of 132kV double circuit 3.8 km of underground cable and 1.9km overhead transmission lines; (ii) upgrading of 11 existing substations; (iii) construction 545 km MV distribution lines; (iv) Installation of 302 distribution transformers and 14 primary substations (33/15 kV); (v) Establishment of Supervisory Control & Data Acquisition (SCADA) & Telecommunication system; (vi) Full implementation of the ESIA and RAP measures, and (vii) Timely undertaking of the capacity building program.

2.9.2 The project will create additional network capacity (transmission & distribution) of 845 MW at an initial stage and will grow to 1,168 MW in the 2020, to allow the supply and distribution of electric power to the capital and its environs.

2.9.3 PITs, with the required skills mix, will be put in place to support project implementation, ensure timely commencement of the works, regular disbursements, timely submission of quarterly progress and environmental monitoring reports, and annual audit reports.

III. PROJECT FEASIBILITY

3.1 Economic and Financial Performance

3.1.1 To determine the impact of the proposed investment, the Bank developed a financial and economic model, based primarily on data from project technical feasibility studies prepared by EEP. The financial analysis of the project is based on the assumptions that are presented in the Addis Ababa Distribution Master Study undertaken by the consultant Pearson Brinkerhoff and reviewed by the donor partners, including the Bank. The project is technically justified because it will result in increased supply, reduction of system energy losses, as well as system reliability improvement. The proposed design option for the project has been evaluated to be the technically least cost option for achieving these results.

3.1.2 The financial analysis of the proposed investment in the network rehabilitation and construction program is based on the incremental impact that would arise by comparing with and without the project scenarios. Further, the financial assessment is based on the incremental energy flow and their additional costs, which are presented in the Distribution Master Plan.

3.1.3 With an assumed tariff of $0.12/kWh (2.7 Birr/kWh) the project will have a positive NPV of USD 214 million at a real discount rate of 3% real and an Internal rate of return (IRR) of 6% real.

The IRR is higher than the project cost of capital. Both EEP and EEU have been financed using government funds that are concessional resources that make the cost of capital lower. The impact of a very low tariff regime and cheap cost of capital are demonstrated by sensitivity tests in Annex B7. By comparing the tariff to the long-run marginal costs of operating each system, it is evident that the tariff should be made cost-reflective while the marginal operating costs should be reduced. The low tariff in Ethiopia has policy implications for private sector participation in the energy sector.

3.1.4 An integrated approach that builds on the financial analysis has been used to conduct the economic analysis. The results of the economic analysis show that the project will yield a high economic internal rate of return (EIRR) of 31% (real) and an economic net present value (ENPV) discounted at the opportunity cost of capital of 12% (real) of USD 857 million.

3.1.5 The main financial and economic results are summarized in Table 3.1 below. The detailed calculations and assumptions are presented in Technical Annex B7.

Table 3.1: Main Financial and Economic Indicators

PARAMETERS	VALUES
FIRR	6% (Real)
FNPV (@ 3%)	USD 214 million
EIRR	31% (Real)
ENPV (@12%)	US$ 857.0 million

3.1.6 The results of the sensitivity analysis show that the financial and economic results are robust under identified adverse conditions. They also reveal that the metrics of the project are more sensitive to a change in end –user tariffs and energy generation costs than to a change in investment cost or changes in the demand. Details of the financial and economic analysis, as well as the sensitivity analysis, are provided in Technical Annex B7.

3.1.7 Since 9 December 2013 when the Ethiopian Electric Power Corp. (EEPCO) was unbundled into EEP and EEU, the financial statements of the initial company (which was an integrated EEPCo) were expected to be prepared separately. After the unbundling, the value chain tariffs and the mechanism of how they will work between EEP and EEU are still being defined. Currently the revenues are shared on a 60/40 basis between EEP/EEU respectively, while the financial performance for assessment purposes is taken as that of a former single company. Using Ethiopian Generally Accepted Accounting Principles (GAAP), the financial statements indicated that the utilities have been profitable for the year 2013 and 2014. Electricity sales representing both local and foreign sales remain the major drivers of profitability. The cost of generation and distribution remain relatively low, while indirect labor costs tend to be higher. The balance sheet reveals a consistently huge amount of inventory and a continuous increase in payables. The company is highly leveraged due to debt used to finance capital investment costs. The Government has taken steps to limit borrowing by ensuring that all requests for debt financing are approved by the Ministry of Water, Irrigation and Electricity (MoWIE). The Government has also transformed some of the debts owed to the utility into equity to improve the solvency of the company. There are also discussions to bring the tariff to cost reflectivity.

3.2 Environmental and Social Impacts

3.2.1 Environment

3.2.1.1 The Project has been categorized as **Category 1**, because the Mekanisa-Gofa sub-project would cause some physical and economic displacement. A Strategic Environmental and Social Assessment (SESA), Environmental and Social Management Framework (ESMF) and Resettlement Action Framework (RAF) were finalized in September 2015. In June 2016, an ESMP for the

Masterplan as well as ESIA and RAP for the Mekanisa-Gofa subproject were prepared. The environmental clearance for these were received from MoWIE in November 2016. The ESIA and RAP summaries for the AATDRUP were posted on the AfDB website July 10, 2017. In addition, screening will be undertaken by EEP and EEU for each individual subproject, based on which subproject-specific ESIAs or ESMPs be prepared.

3.2.1.2 **Positive Impacts**: Reliance on more carbon-intensive energy sources will be reduced and improved economic activities facilitated which will create job opportunities to women and youth.

3.2.1.3 **Negative Impacts:** Temporary physical and economic displacement will result from the Mekanisa-Gofa subproject which involves erecting a 1.9 km long 132 kV overhead transmission line (see Section 3.15 below). Solid and liquid waste will be generated in the form of replaced metals structures, cables, packaging, polychlorinated biphenyls (PCBs), waste oil, fluorescent bulbs and heavy metals (chromium, copper and arsenic). Occupational health and safety impacts issues include working with high voltages and at heights, electrocution and general community safety concerns.

3.2.1.4 **Mitigation:** EEP will seek to reduce the quantity of waste generated. A secure, central holding facility will be provided for redundant and hazardous waste. EEP and EEU will allocate sufficient financial resources to implement the ESMP during both construction and operation, and contractors will be contractually bound to implement impact mitigation and monitoring. Training (including OHS) will be provided. EEP will hire and fund competent supervisory staff EEP to enforce compliance. Mitigation costs (excluding compensation and resettlement costs) and ESMP implementation are expected to be in the region of USD 80,000 over a 4-year implementation period.

3.2.1.5 **Institutional Arrangements**: Each PIT will be staffed with, among others, an environmentalist/health and safety specialist, a social expert, and a wayleaves officer. The CJPC will be responsible for ensuring that environmental and social mitigation measures are implemented by the Contractor(s) in line with the ESMPs prepared for the individual projects. The respective EEP and EEU PIT's environmentalists/health and safety specialists will be in charge of monitoring environmental, social, occupational and community health and safety issues. Additionally, they will ensure compliance with both the ESMP and national and AfDB and JICA safeguards requirements.

3.2.2 Climate Change

3.2.2.1 The project consists of rehabilitation and upgrading of existing transmission and distribution network in a predominantly urban area. Minimal clearing of vegetation will be necessary. An underground cable of 16 km is to be placed within the road reserve in areas where there is no history of flooding and/or where drainage facilities have been provided by the new road infrastructure. The 132kV 1.9 km long overhead transmission line will replace an existing 132 kV line and will remain within the existing Right of Way (RoW). The low and medium voltage distribution lines will replace existing ones. Thus, the Project's vulnerability to climate risk, as well as its contribution to climate change, is considered to be minimal.

3.2.2.2 Reliance on more carbon intensive localized energy sources such as diesel generators and biomass fueled stoves will be reduced. A reduction in the use of biomass will also help reduce the rate of deforestation, which is a significant issue in Addis Ababa and the wider study area. The project is category 3 with regards to its level of vulnerability to climate change.

3.2.3 Gender

3.2.3.1 The Bank, through the Korea Trust Fund supported project ***"Institutional Capacity Strengthening for Gender Mainstreaming in Infrastructure"*** has been implementing interventions designed to enhance the capacity of EEP and EEU, including gender audit, guideline and tools development and extensive staff training. This has created awareness and consensus around measures to ensure that both men and women participate in and benefit from sector policies/programs and that inclusive opportunities are provided for professional development of women in the sector institutions. The gender interventions in this Project will build on the outcome of that effort.

3.2.3.2 Among the Project Affected Peoples (PAPs) in the Mekanisa-Gofa subproject who will potentially experience temporary livelihood displacement, female heads of Households (HHs) make up 71% and 30% of the dairy co- and vegetable growers co-operatives, respectively. The threat of increased exposure to AIDS is limited as there will not be an influx of workers into the area**.**

3.2.3.3 Women will benefit from direct and indirect job opportunities and income generation activities, improvements to existing social infrastructure and services, the use of improved technology for the preparation of food. Some 30% of the semi-skilled and unskilled temporary jobs will be assigned to women.

3.2.3.4 The Project's contribution to inclusive socio-economic transformation and enhanced benefits for women, include:

(i) ***Equitable access:*** The Project Log Frame target for the "additional customers connected" reflects a separate target for vulnerable households, including female headed households, and the result will be tracked accordingly.
(ii) ***Capacity building***: 30% of the participants in staff training will be women and all the women members of the vegetable growers and dairy co-operatives will benefit from the planned entrepreneurship capacity development training.
(iii) ***Information generation and analysis***: In line with Gender Audit recommendations and EEP and EEU Managements' commitment to implement the action plan, all data/information generated by the project will be sex-disaggregated and gender-analysed. In addition, existing data on households' willingness and ability to pay for electricity services will be reviewed or a new study conducted with an explicit focus on poverty- and gender-related dimensions. This will generate recommendations for developing access solutions for the poorest and excluded and inform measures for addressing gender differences in the use of and benefit from electrification.
(iv) ***RAP Implementation***: Women will be members of the RAP Committees and 100% of the compensation to households will be effected through husband-wife joint accounts.

3.2.4 Social

3.2.4.1 The project will refurbish and upgrade the distribution "backbone" removing supply constraints and allowing connection and expansion of the wider distribution network, thus providing reliable, reinforced and expanded energy supply to households, small businesses and industrial zones. The anticipated socio-economic project benefits include: (i) Improved efficiency of production of goods and provision of services thus stimulating local and regional economic growth; (ii) Creation of short term employment during the construction stage and longer term employment during the operational phase; (iii) Improvement in the coverage and reliability of mobile phone and internet services; (iv) Reduction in the costs and inconvenience associated with using substitute forms of energy during power disruptions; (v) Community health and safety improvement because of replacement/removal of old and contaminated equipment; and (vi) Visual improvements associated with replacement of old and damaged above-ground distribution lines and use of

underground cables in city center areas. To increase the project's contribution to inclusive growth, a special connection charge subsidy mechanism for enabling vulnerable households' connectivity is reflected in the project implementation measures.

3.2.4.2 Negative Social Impacts and Mitigation measures**.** The main expected adverse social impact of the project will be the temporary livelihood disruption of the dairy and vegetable producers' co-operatives who will temporarily lose access to their land (but will be able to cultivate there after construction) and potential safety challenges during construction. The ESMP and the RAP will be implemented in accordance with the Bank's policy to offset these impacts focusing on the following: *(i)* ***Compensation/replacement:*** Full and timely settlement of compensation for the PAPs and provision of replacement land for the storage shade to be removed. The single affected household will be compensated and the shed will be relocated. *(ii)* ***Livelihood restoration/improvement***: A tailored entrepreneurship capacity development training will be undertaken for the members of the vegetable growers and dairy co-operatives that are project-impacted. This will contribute to livelihood restoration but also the long-term resilience of the households. *(iii)* ***Health and Safety***: The contractors' obligations will reflect highest safety standards in line with international best practices as well as the development and implementation of a health and safety plan, including community sensitisation. Full time H&S personnel will also be deployed as part of the PIU staff mobilization. Although an increase in HIV/AIDS is considered insignificant for this project, an HIV/AIDS and STI awareness and prevention intervention will be planned and executed as part of the H&S interventions.

3.2.5 Involuntary Resettlement

3.2.5.1 Overall, Project works will not require a significant resettlement or relocation of residents as works will be undertaken within the existing ROW, while planned substation modifications will be undertaken within the existing substation footprints on land already owned by EEP. The Mekanisa-Gofa subproject will result in temporary livelihood displacement due to partial demolition of a hay/fodder storage shed belonging to a group of seven dairy cooperatives which have a total membership of 73 (52 women, out of which 8 are female heads of households) affecting an estimated number of 365 people. Permanent loss of crops and trees and temporary suspension of agricultural activities will occur on 53 plots that belong to vegetable producer co-operatives during the construction phase of the project expected to last between 6 and 12 months in total. Only one house inhabited by one household is likely to face physical displacement.

3.2.5.2 PAPs will be compensated for all their losses and replacement land provided to the dairy co-operative before start of the construction work in accordance with AfDB policy on Involuntary Resettlement and Integrated Safeguards System (ISS). EEP, which has accumulated sufficient experience over the years in managing resettlement and compensation actions, will be responsible for the RAP implementation while monitoring will be done by the mandated federal and regional institutions.

3.2.6 Stakeholders

3.2.6.1 An extensive public consultations process was undertaken during design of the project in the preparation of the ESIA and RAP by the design consultants, through people affected by project (PAP) group discussions, town hall and office meetings. The project SESA, ESMF and RAF, and subproject ESIA and RAP reports have adequately covered the consultation processes and findings, as well as the disclosure process. The AfDB identification and appraisal missions have also conducted consultations with a variety of stakeholders including a cross section of the affected population (women, men, youth), federal, regional and local government officials and civil society stakeholders expected to be involved in the regulation and operationalization of the safeguard

measures proposed in the ESMP. These stakeholders will continue to be involved in the monitoring of the implementation of the ESMP and
RAP.

3.2.6.2 Some of the feedback received during consultations include concerns about delay in payment of compensation, disclosure of safeguard documents and co-ordination in the operationalization of the ESMP. These concerns were addressed in the design of the project and follow up actions. The safeguard documents of the project have been posted on the EEP and EEU website and copies shared with the relevant federal, regional and local government offices.

IV. PROJECT IMPLEMENTATION

4.1 Implementation arrangements

4.1.1 The GoE, through the Ministry of Finance and Economic Cooperation (MoFEC) will be the borrower of the loan. Ethiopian Electric Power (EEP) and Ethiopian Electric Utility (EEU) will be the executing agencies. The loan proceeds will be on lent by MoFEC to EEP and EEU, whose mandate[5] is to implement the transmission and distribution project components respectively, by signing a subsidiary loan agreement (on-lending) on terms and conditions acceptable to the ADF.

4.1.2 EEP has the technical and managerial ability to implement the project as demonstrated by the ongoing Ethiopia – Kenya Electricity highway project and similar distribution projects financed by the Bank and other development partners. EEU is managing the Rural Electrification project under UEAP funded by the Bank and several DPs. Even though the team gained experience from similar projects, the overall coordination of the project shall be the responsibility of EEP. To ensure effective coordination of activities of the project for components to be implemented under EEP and EEU, a JPC will be appointed to follow-up the overall coordination of the project. This JPC, appointed by EEP in consultation with EEU, will be reporting to the Chief Executive Officers (CEOs) of both executing agencies. The Joint Project Manager primary responsibility shall be the coordination of common tasks by the two utilities EEP and EEU and the communication with the Bank.

4.1.3 The PIT functions include among others, the coordination and joint review of selection of consultants and communication with the Bank regarding the overall implementation of the Project including obtaining the Bank's no objection for aspects of project implementation and procurement related matters. The Joint Project Manager shall also be responsible for compilation and transmission of the consolidated quarterly project reports to the Bank. The project implementation structure is shown in the Appendix I and for details refer technical annex section B3.

4.2 Procurement Arrangements

4.2.1 Procurement of goods, works and acquisition of consulting services under the project which are financed by the Fund will be carried out in accordance with the Procurement Policy for Bank Group funded operations, dated October 2015 and following the provisions stipulated in the Financing Agreement. Specifically, procurement under the project will be carried out following: i) Borrower Procurement System (BPS): Specific Procurement Methods and Procedures (PMPs) under BPS comprising the legal instruments having the force of law in the Borrower's country which include the Public Procurement and Property Administration Proclamation (September 2009) using the national Standard Solicitation Documents (SSDs) for

[5] Mandate established under council of Ministers Regulations 302/2013 & 303/2013

various group of transactions to be entailed under the Project; and ii) Bank Procurement Methods and Procedures (BPPs): Bank Standard PMPs using the relevant Bank Standard or Model Solicitation Documents (SDs), for procurement of contracts that are acquired on Open Competitive Bidding (OCB) basis at the international level.

Procurement Risks and Capacity Development

4.2.2 The assessment of procurement risks at the Country, Sector and Project levels and of procurement capacity at the Executing Agency (EA) level were undertaken for the project and the outputs have informed the decisions on the procurement regimes (BPS and BPP) being used for groups of similar transaction under the project.

Use of Advance Contracting

4.2.3 The Government made a request for the use of Advance Contracting (AC) procedures to allow an early start of the procurement process of the project prior to the approval of the financing of the project by Bank with the objective of expediting the implementation of the project. The Bank is reviewing the Government's request in view of providing a response in October 2017. It is noted that activities pertaining to the preparation of the procurement documents of the project have progressed well reaching their final stage.

4.2.4 The project's abbreviated procurement plan was discussed during the project appraisal. The detailed Procurement Plan was submitted for the Bank's review and no objection by the Executing Agencies (EEP and EEU) prior to loan and grant negotiations held on 19 – 20 October 2017.

4.2.5 Details of the procurement arrangements under the project are summarized in the Procurement Technical Annex B5.

4.3 Financial Management and Disbursement Arrangements

4.3.1 The Financial Management Systems of the EEP and EEU are adequate and capable of recording accurate and complete transactions and delivering financial reports timely. The companies use an automated financial reporting system, AGRESSO, which is specifically designed to meet the needs of the respective utilities' operations. Both companies have adequate and qualified staff to carry out the financial management responsibilities of the respective components of the project. EEP and EEU were established as autonomous public enterprise (Regulation No. 302/2013) when the former Ethiopian Electric Power Corporation (EEPCo) was divided into two independent entities: EEP and EEU which are responsible for the planning, budgeting, financial management, execution and monitoring of their respective project components of the entities. Both companies generate their own revenues and able to receive loans from foreign and local sources. Neither EEP nor EEU receives any allocation from the federal budget. Their budgets are approved independently by their respective Board of Management. A detailed financial management assessment is attached as technical annex B.4.

4.3.2 In line with the Paris Declaration on Aid Effectiveness and Accra Agenda for Action, the project will make use of the Ethiopia's PFM systems in place at the EEP and EEU. The day to day management will be as per the financial management policies and systems of EEP and EEU respectively, as has been the case for previous Bank financed projects within EEP. The Executing agencies will set up new account codes (as extended from the main chart of accounts of each company) to record and report the financial transactions of the respective components of the project within their accounting systems in time.

4.3.3 Bank financed projects executed by EEP so far have demonstrated timely financial statements with annual audit reports submitted to the Bank timely. However, for EEU, this is the first Bank financed project. However, most of the staff were in the previous EEPCo which had experience with Bank financed projects. The audits for all ADF financed projects and other projects for previous years were carried out by Audit Services Corporation (ASC). All project audit reports for the FY 2014/2015 and 2015/2016 were submitted in time.

4.3.4 Both EEP and EEU have a well-functioning Internal Audit Directorates that report directly to their respective Board of Management/through the CEOs. This directorate has been further strengthened with employment of additional staff members. However, due to risk based auditing principle of the organizations, they have never produced a specific project audits for ongoing AfDB for previous projects managed under the EEP. This is an important issue to be addressed by the Senior Management of the executing agencies that the internal audits shall include specific project audits in their annual audit work plans to make an audit report twice a year or at least once in a year.

4.3.5 Each project component in each executing agency will have one assigned project accountant selected from the permanent staff of each company, who will be in charge of handling the project financial transactions and will functionally report to the respective project coordinators and the Chief Finance Officers (CFOs) of EEP and EEU.

4.3.6 The project financial statements for the respective Executing Agencies for their own components will be audited separately by the Office of the Federal Auditor General (OFAG) or by a qualified audit firm to be recruited competitively. The audit is to be conducted based on the Bank's standard audit terms of reference and in accordance with the International Standard for Auditing (ISA). The complete audited project financial statements including a management letter will be submitted to the Bank within six (6) months after the end of the fiscal year.

4.3.7 EEP and EEU will utilize as needed the Bank's four disbursement methods explained in the Disbursement Handbook. However, due to the project nature and arrangement, it will mainly use the Direct Payment method. No Special account method is to be used unless it is agreed between the Bank and the Utilities due to certain circumstances to occur during the implementation period. The Bank's Disbursement Letter will be issued stipulating key disbursement procedures and practices.

4.4 Monitoring and Evaluation

4.4.1 EEP and EEU's performance is monitored through the preparation of periodic monthly and quarterly reports for both senior management and the Board. There are established performance indicators and budgets against which actual reporting is done and significant variances explained. The Bank requires quarterly progress reports (QPR) showing cash receipts by sources and expenditures by main expenditure classifications together with physical progress reports linking financial information with physical progress and highlighting issues that require attention. The sector indicators for power infrastructure projects, as captured in the log frame, will be monitored using reports produced by MoWIE, MoFEC, EEP, EEU and the Ethiopia Energy Authority (EEA).

4.4.2 The Project will be launched in the 3rd quarter of 2018 and will be monitored through supervision missions from the Bank's headquarters, Regional Resource Centre and the Ethiopia country office (COET) at least twice a year from 2019 through to 2023. The Bank supervision will also involve desk supervisions including review of bi-annual progress and annual audit reports. The COET will also carry out field supervisions twice a year or on a need basis. The coordination of the missions will be done by the MoFEC in collaboration with the MoWIE.

4.4.3 The PITs, assisted by the consultant, has the primary responsibility for monitoring project implementation and fulfilling EEP and EEU reporting obligations to the Bank, including preparation and submission of QPRs and annual audit reports. These reports shall cover all aspects of project implementation, including the status of progress, implementation of environmental and social mitigation measures as well as status of fulfilment of the loan conditions.

4.4.4 The supervision consultants shall be required to prepare and submit to EEP, EEU and the Bank, final commissioning reports at the completion of their assignments and assist the employer in Project Completion Report (PCR) preparation. After the completion of the project, the EAs will prepare the PCR, which would serve as input in the preparation of the Bank's own PCR.

4.4.5 During implementation, EEP and EEU Environmental, Health, Safety and Quality (EHS&Q) Office assisted by the consultant will monitor the ESMP and will prepare and submit to the Bank quarterly environmental reports. The EHS&Q Unit has been handling such tasks and is fully **conversant** with Bank procedures. The Environmental Unit under the MoWIE will also be actively involved during the monitoring phase.

4.4.6 Mid-Term Review (MTR): The Bank mid-term review of the project will be held not later than 18 months after the loan approval, which shall inform any adjustments to the project design to ensure that project objectives are achieved.

4.4.7 Implementation Schedule and Supervision: The project will be implemented over a period of 5 years. On the assumption that the ADF loan is approved in November 2017, the project physical work scheduled for completion by March 2023 with the commissioning of all sections of transmission lines, substations and Distribution components. The critical milestones for project implementation are given below:

Table 4.1 Project implementation milestones;

No.	Activity	Responsible Parties	Time frame
1	Construction contracts commencement (receipt of advance payment)	EEP & EEU	Feb. 2019
2	Preparation of environmental mitigation measure	EEP, EEU and project supervision and management consultant	Nov. 2018
3	Site mobilization	Contractors (transmission line, substations and distribution components)	March 2019
4	Completion of design, manufacturing, supply and installation of the transmission line, substations and distribution contracts	Turnkey contractors	Dec. 2022
5	Test and commissioning of the completed installations	EEP, EEU, consultant and Contractors	January-March 2023

4.5 Governance

4.5.1 EEP and EEU are managed by their Board of Directors and each Board consisting of 5 members from various Ministries, Educational Institutions and Government organizations and the CEO of EEP and EEU. The Board holds monthly meetings and works closely with the Management Committee of EEP & EEU regarding the overall activities of the power utilities. The internal controls of the power utilities are very effective in monitoring the utilization of its resources. Furthermore, EEP and EEU financial statements are audited annually by the Audit Service Corporation (ASC), a governmental entity which carries out annual audits for public and private organizations in the country. However, employing (contracting) other competent private audit firms is also possible under competitive selection. At the project level, the project office will be required to maintain accounting and financial records that will be audited in accordance with international accounting standards.

4.5.2 In general, the energy sector's governance issues are well-articulated in Ethiopia. Currently, the country has begun undergoing Civil Service Reform Programs to attain competitiveness and accountability in all sectors including the energy sector. Furthermore, the Government has established an Anti-Corruption and Ethics Commission with the objective of fighting corruption at all levels and enhancing transparency and accountability. The commission is being strengthened through technical assistance programs from some development partners.

4.6 Sustainability

4.6.1 **Government Commitment**: GoE has shown great commitment to implementing the project because it will provide support to transmit and distribute sufficient and reliable power for industrial development and electricity access scale-up, to strengthen the national economy and livelihoods of the population.

4.6.2 **Technical Sustainability**: EEP and EEU over the decades have implemented similar projects and the staff has gained considerable experience in the implementation of such projects. They also have staff experienced in the operation and maintenance of high-voltage transmission lines, substations and distribution networks. In addition, EEP and EEU have allocated significant financing for the rehabilitation and upgrading of the existing transmission & distribution installations to get assurance of sustainability of the electricity supply. Capacity building for EEP and EEU staff involved in engineering, operation & planning functions is foreseen in the project design.

4.6.3 **Financial Sustainability**: The tariff system in Ethiopia is still a cautious tariff regime. A uniform tariff is charged with a lifeline tariff for the first block of 50kWh of consumption maintained since the last tariff change in July 2006. Current tariffs average US0.0273/kWh across all consumer categories and tariff levels this low cannot cover all non-power operating costs and purchased power costs and effectively place the utility in a position whereby it has a strong financial incentive to connect additional consumers. If tariffs are not periodically adjusted to cover these costs, the financial situation of the electric utilities will deteriorate resulting in decreasing service quality and impacting the sustainability of electricity supply services.

4.6.4 As a mitigation measure Government supports in capital injection through financing some of capital investments and granting debt restructuring to reduce the burden of loan repayments from cash flows and foreign earnings from energy exports that commenced to Sudan and Djibouti generating close to USD 100 million p.a and committed 400 MW to Kenya by 2019. In addition, EEP & EEU appears to be working within the framework of achieving a selling price of electricity placed or suppressed to a rate equivalent to US0.06/kWh depending on the prevailing exchange rate. Recently, EEP has submitted a gradual cost recovery tariff adjustment proposal initially up to 50% increase adjustment because the rate has fallen below the benchmark rate of at US0.06/kWh due to mostly foreign exchange (FE) fluctuations and increase in operation expenses. The request is under consideration by the EEA & EEU and a decision is expected after undergoing scrutiny in the Council of Ministers and the parliament, and revised tariff expected to be implemented in the year 2019.

4.6.5 **Institutional Sustainability**: The Sector undergone reform by restructuring of the monopolistic former entity (EEPCo) into two independent entities mandated; EEP to be responsible for the bulk generation, transmission and substation operation and construction of new installations and EEU to be responsible for distribution system operation, construction, energy sales and customer services through commercialization and decentralization of their operations to achieve efficiency & effectiveness.

4.6.6 **Private sector participation**: The public sector-led development strategy implemented over the past decade, focusing on heavy investments in infrastructure, has sustained strong economic growth, which reached an estimated 10.3% in 2013/14, which is over double of the Sub-Saharan Africa (SSA) average growth rate. Under GTP II, the Government is placing emphasis on private sector involvement as a vehicle for sustaining the gains made to-date and realizing Ethiopia's middle income status by 2025. The new Energy law allows local private investment in generation facilities up to 25 MW (hydro, thermal and renewables) including community organized cooperatives and similar entities. Over 25 MW, it allows local or foreign investment in power projects.

4.6.7 The recent agreement with a private company to develop 2,000 MW Corbetti geothermal power plant on IPP basis and currently advertised development of three 100 MW capacity solar plants on IPP demonstrates the Government's intention towards gradual opening of the power sector to private sector participation. The Bank also supported the 'Roadmap to the Public Private Partnerships Framework in Ethiopia" study which was completed in 2014, recommending government to issue a Public Private Partnerships (PPPs) policy statement. As a result of this study, PPP legislation has been developed and is currently under review by Parliament before promulgation.

4.7 Risk Management

The major risks and mitigating measures during project implementation are outlined in the table below:

Table 4.2 Risk Management

Risk	Description	Rating	Mitigation measures
Shortage of financing resources	Insufficient fund for project implementation	Medium	Government support to financing (counterpart funding) and commitment to implement, transmission and distribution project components
Project completion delay	Electricity supply and distribution infrastructure projects implementation delay	Medium	Deployment of project management teams and advance procurement supervision consultant ahead of start of the project & re-enforcement of PITs.
Project cost overrun	Project implementation cost exceeding the allocated budget	Medium	Physical (5%) and price (5%) contingencies built into the project costs and the contract packaging will ensure that all necessary construction guarantees and insurances will be in place
Sustainability of the project (low tariff)	Tariff levels is below true costs of producing, transmitting and distributing electricity (including financing costs)	Medium	Government has been very supportive through financing some of capital investments and granting debt restructuring to reduce the burden of loan repayments on EEP's cash flows. Whilst EEP does not currently employ foreign exchange hedging mechanisms, the impact of ETB devaluation will be mitigated through foreign earnings from energy exports that commenced to Sudan and Djibouti by 2011 generating close to USD 100 million p.a and committed 400 MW to Kenya by 2019. In addition, the process to revise the existing tariff and gradual increase to $ 0.06/kWh has started, and will also contribute much for improvement in financial viability.
Timely implementation of compensation & RAP	Resettlement and compensation program may not be implemented in a timely manner owing to capacity limitation and litigations which might arise.	Medium	Appraisal mission has critically examined the implementation program, the skill mix composition of the team implementing the agreed plan to ensure that the team has adequate experience and competence mix on resettlement and compensation issues.

Note: Risk rating (high, medium or low)

4.8 Knowledge building

4.8.1 The proposed project area is in the central part of the country and provides an opportunity to EEP and EEU staff to accumulate and consolidate knowledge in building transmission lines, associated substations and distribution lines in densely populated areas. Therefore, during the construction of the transmission line, substations, distribution lines and the installation of the equipment, EEP and EEU staff will be trained on the job by the contractors and the consultant. The Bank staff involved in the project will also gain access to the technology which could be applied to other Regional Member States that intend to implement similar projects.

4.8.2 The ESIA and the ESMP for the project were conducted by EEP and EEU and these diagnostics conform to international practices in Health, Safety and Environment (HSE) standards. Implementation of the ESMP including the monitoring system will allow the EEP and EEU to promote international best practice in design and implementation of transmission and distribution systems upgrade in existing metropolitan cities such as Addis Ababa. Also, designed Institutional Capacity Building training on environmental and social compliance for local institutions including the local Woreda / national agencies responsible for advising on and inspecting aspects. Provision has also been made for capacity building within EEP and EEU as part of this project.

V. LEGAL INSTRUMENTS AND AUTHORITY

The Project will be governed by a Loan Agreement and a Protocol of Agreement between the Fund and the Federal Democratic Republic of Ethiopia.

5.1 Conditions Associated with Fund's intervention

5.1.1 The Loan Agreement shall enter into force subject to fulfilment by the Borrower of the provisions of Section 12.01 of the General Conditions Applicable to African Development Fund Loan Agreements and Guarantee Agreements (Sovereign Entities).

5.1.2 The Protocol of Agreement will enter into force upon its signature by the Federal Democratic Republic of Ethiopia and the African Development Fund.

5.1.3 The obligation of the Fund to disburse the Loan and /or the Grant shall be conditional upon the entry into force of the respective Agreements in accordance with Section 5.1.1 or 5.1.2 above, and the fulfillment by the Borrower/Recipient, in form and substance satisfactory to the Fund, of the following conditions:

A. Conditions Precedent to Disbursement for services.

(i) The Borrower/ Recipient has submitted to the Fund a Works and Compensation Schedule (the "Works and Compensation Schedule") detailing (A) each section of construction works under the Project and (B) the time frame for compensation and resettlement of all project-affected persons) in respect of each section, in accordance with the RAP or an updated RAP;

(ii) An On-lending Agreement has been signed between the Borrower/Recipient and Ethiopian Electric Power (EEP) and Ethiopian Electric Utility (EEU) in which the Borrower on –lends the Loan to EEP and EEU and the Grant to EEU , on terms and conditions acceptable to the Fund; and

(iii) Submission of evidence that the Borrower has secured financing from alternative sources, in the event of a financing gap due to failure to obtain the JICA co-financing under the Project.

B. Conditions Precedent to Disbursement for civil works:

(i) Compensation and/or resettlement in accordance with the RAP and the Works and Compensation Schedule, of all Project Affected Persons in respect of the construction works under the **first section/ lot of** the Project.

C. . Undertakings:

The Borrower undertakes to;

(i) Compensate and/or resettle all Project Affected Persons, prior to commencement of works on any subsequent section of a given lot, in accordance with the RAP and any updates to the RAP, as well as the Works and Compensation Schedule;

(ii) Ensure that EEP and EEU each recruit an additional Environmental and Social expert to strengthen their environmental and social team, and a communications expert;

(iii) Implement the Project in accordance with national legislation, the Environmental and Social Impact Assessment (ESIA) and the Environmental and Social Management Plan (ESMP), and report to the Fund on a quarterly basis in a form acceptable to the Fund, on the implementation of the ESIA and the ESMP;

(iv) Ensure that EEP and EEU submit quarterly financial and annual audit reports in a timely manner to the Fund.

5.2 Compliance with Bank Policies

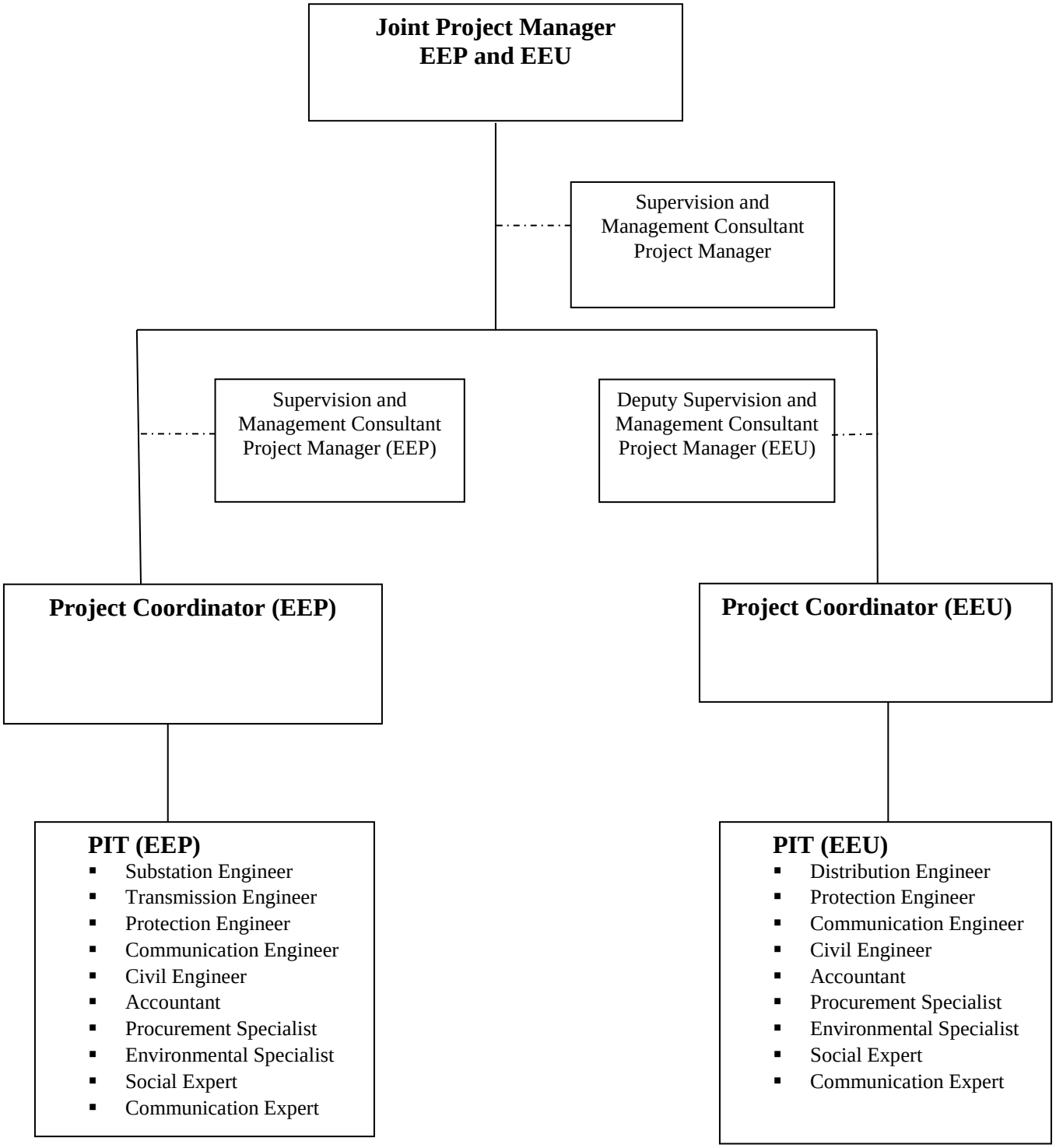
5.2.1 This project complies with all applicable Bank policies. It is consistent with the Bank's Energy Sector Policy, approved in October 2012, and the New Deal on Energy for Africa.

VI. RECOMMENDATION

Management recommends that the Board of Directors approves the proposed ADF Loan UA 61.41 million and ADF Grant UA 10.82 million to the Federal Democratic Republic of Ethiopia for the purposes and subject to the conditions stipulated in this report.

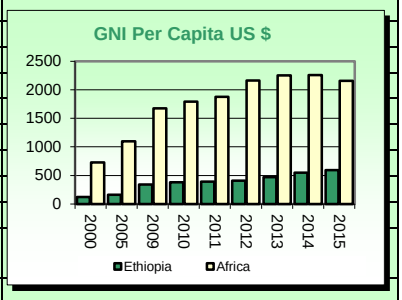
Appendix I: Structure of the Proposed Implementation Arrangement

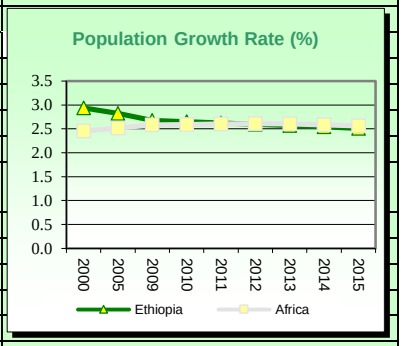
ADDIS ABABA TRANSMISSION & DISTRIBUTION SYSTEM REHABILITATION AND UPGRADING PROJECT (AATDRUP)

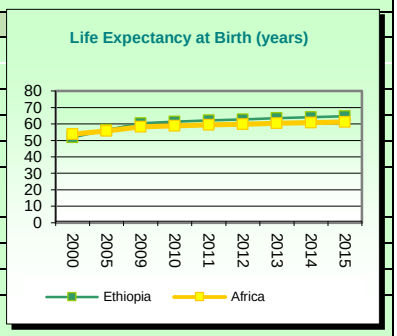


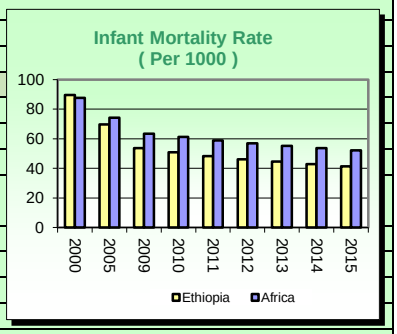
Appendix II: Comparative Socio – economic Indicators

	Year	Ethiopia	Africa	Developing Countries	Developed Countries
Basic Indicators					
Area ('000 Km²)	2016	1,104	30,067	97,418	36,907
Total Population (millions)	2016	101.9	1,214.4	6,159.6	1,187.1
Urban Population (% of Total)	2016	19.8	40.1	48.7	81.1
Population Density (per Km²)	2016	101.9	41.3	65.1	33.8
GNI per Capita (US $)	2015	590	2 153	4 509	41 932
Labor Force Participation *- Total (%)	2016	83.0	65.7	63.5	60.0
Labor Force Participation **- Female (%)	2016	77.1	55.7	48.9	52.1
Sex Ratio (per 100 female)	2016	99.6	100.1	106.0	105.0
Human Dev. Index (Rank among 187 countries)	2015	174	...	...	...
Popul. Living Below $ 1.90 a Day (% of Population)	2010	33.5	...	18.3	...
Demographic Indicators					
Population Growth Rate - Total (%)	2016	2.5	2.5	1.3	0.6
Population Growth Rate - Urban (%)	2016	4.9	3.6	2.4	0.8
Population < 15 years (%)	2016	40.9	40.9	27.9	16.8
Population 15-24 years (%)	2016	21.7	19.3	16.9	12.1
Population >= 65 years (%)	2016	3.5	3.5	6.6	17.2
Dependency Ratio (%)	2016	79.8	79.9	54.3	52.0
Female Population 15-49 years (% of total population)	2016	24.5	24.0	25.7	22.8
Life Expectancy at Birth - Total (years)	2016	65.1	61.5	69.9	80.8
Life Expectancy at Birth - Female (years)	2016	67.1	63.0	72.0	83.5
Crude Birth Rate (per 1,000)	2016	31.4	34.4	20.7	10.9
Crude Death Rate (per 1,000)	2016	7.0	9.1	7.6	8.6
Infant Mortality Rate (per 1,000)	2015	41.4	52.2	34.6	4.6
Child Mortality Rate (per 1,000)	2015	59.2	75.5	46.4	5.5
Total Fertility Rate (per woman)	2016	4.2	4.5	2.6	1.7
Maternal Mortality Rate (per 100,000)	2015	353.0	476.0	237.0	10.0
Women Using Contraception (%)	2016	37.8	31.0	62.2	...
Health & Nutrition Indicators					
Physicians (per 100,000 people)	2005-2015	2.5	41.6	125.7	292.2
Nurses and midwives (per 100,000 people)	2005-2015	25.2	120.9	220.0	859.4
Births attended by Trained Health Personnel (%)	2010-2015	15.5	53.2	69.1	...
Access to Safe Water (% of Population)	2015	57.3	71.6	89.4	99.5
Access to Sanitation (% of Population)	2015	28.0	39.4	61.5	99.4
Percent. of Adults (aged 15-49) Living with HIV/AIDS	2015	...	3.4	...	...
Incidence of Tuberculosis (per 100,000)	2015	192.0	240.6	166.0	12.0
Child Immunization Against Tuberculosis (%)	2015	75.0	81.8	...	...
Child Immunization Against Measles (%)	2015	78.0	75.7	83.9	93.9
Underweight Children (% of children under 5 years)	2010-2015	25.2	18.1	15.3	0.9
Prevalence of stunting	2010-2014	40.4	33.3	25.0	2.5
Prevalence of undernourishment (% of pop.)	2015-2016	32.0	16	13	...
Public Expenditure on Health (as % of GDP)	2014	2.9	2.6	3.0	7.7
Education Indicators					
Gross Enrolment Ratio (%)					
Primary School - Total	2010-2016	100.1	101.2	104.9	102.4
Primary School - Female	2010-2016	95.8	98.4	104.4	102.2
Secondary School - Total	2010-2016	37.7	52.6	71.1	106.3
Secondary School - Female	2010-2016	35.8	50.2	70.5	106.1
Primary School Female Teaching Staff (% of Total)	2010-2016	41.9	47.1	59.8	81.0
Adult literacy Rate - Total (%)	2010-2015	49.0	66.8	82.3	...
Adult literacy Rate - Male (%)	2010-2015	57.3	74.3	87.1	...
Adult literacy Rate - Female (%)	2010-2015	41.0	59.4	77.6	...
Percentage of GDP Spent on Education	2010-2015	4.5	5.0	4.0	5.0
Environmental Indicators					
Land Use (Arable Land as % of Total Land Area)	2014	15.1	8.7	11.2	10.3
Agricultural Land (as % of land area)	2014	36.3	41.7	37.9	36.4
Forest (As % of Land Area)	2014	12.5	23.2	31.4	28.8
Per Capita CO2 Emissions (metric tons)	2014	0.1	1.1	3.5	11.0









Sources: AfDB Statistics Department Databases; World Bank: World Development Indicators; last update: June 2017
UNAIDS; UNSD; WHO, UNICEF, UNDP; Country Reports.

*Note: n.a.: Not Applicable; … : Data Not Available. * Labor force participation rate, total (% of total population ages 15+)*

*** Labor force participation rate, female (% of female population ages 15+)*

Appendix III: Ongoing Portfolio in Ethiopia as at 31 August 2017

No	Project	Loan/Grant		Disburs.	IP	DO	PFI Status	Age	
		Approval Date	Amount (UA)	Ratio				Years	Closing Date
PUBLIC SECTOR OPERATIONS									
AGRICULTURE SECTOR			**58,482,000**						
1	Drought Resilience and Sustainable Livelihoods I	19-Dec-12	30,000,000	31.40%	2	3	PPP	4.7	31-Dec-19
2	Drought Resilience and Sustainable Livelihoods II	26-Nov-14	28,482,000	11.50%	3	3	PPP	2.8	31-Dec-20
TRANSPORT SECTOR			**384,037,699**						
3	Mombasa-Nairobi-Addis Road Corridor –Agere Mariam -Yabelo Road Project (Phase II)	1-Jul-09	85,000,000	96.08%	3.36	3.25	NON-PP/NON PPP	8.2	31-Dec-17
4	Mombasa-Nairobi- Addis Road Corridor-Hawassa-Agere Mariam Road Project (Phase III)	30-Nov-11	105,000,000	55.78%	3	3	NON-PP/NON PPP	5.8	31-Dec-19
5	Bedele-Metu Road Upgrading	10-Nov-11	41,060,000	79.23%	3	3	NON-PP/NON PPP	5.8	31-Dec-19
6	Modjo- Hawassa Highway Road Project Phase I	6-Nov-13	84,080,000	35.90%	4	4	NON-PP/NON PPP	3.8	31-Dec-20
	Modjo- Hawassa Highway Road Project Phase I*	6-Nov-13	1,630,000	10.08%	4	4	NON-PP/NON PPP	3.8	31-Dec-20
7	Ethiopia Integrated Transport Program Phase I	7-Dec-16	67,267,699		NR	NR	NON-PP/NON PPP	0.7	31-Dec-23
ENERGY SECTOR			**223,810,000**						
8	Ethiopia-Kenya Electricity Highway Project	19-Sep-12	150,000,000	29.89%	3	3	NON-PP/NON PPP	5.0	31-Nov-19
9	Mekelle-Dallol & Semera-Afdera Power Transmission Project.	14-July-16	73,810,000	-	NR	NR	NON-PP/NON PPP	1.1	31-Dec-20
WATER SECTOR			**124,147,122**						
10	Support to the One Water Sanitation and Hygiene National Water Program	8-Sep-14	62,280,000	43.60%	3	3	NON-PP/NON PPP	3.0	30-Jun-19
	Support to the One Water Sanitation and Hygiene National Water Program*	8-Sep-14	7,855,073	37.86%	3	3	NON-PP/NON PPP	3.0	30-Jun-19
11	Four Towns Water and Sanitation Improvement Program	13-Jan-16	54,012,049	0.73%	3	3	NON-PP/NON PPP	1.6	31-Dec-21
MULTI - SECTOR			**186,143,000**						
12	Basic Services Transformation Program	17-Dec-15	180,000,000	66.67%	3	4	NON-PP/NON PPP	1.7	31-Dec-18
13	Institutional Support project for PPPs	26-May-15	1,173,000	46.44%	3	4	NON-PP/NON PPP	1.3	31-Dec-18
14	Ethiopia-Africa Trade insurance-RMC Membership Program	23-Sep-15	4,970,000	100%	NR	NR	NON-PP/NON PPP	1.9	31-Dec-19
	PUBLIC SECTOR TOTAL		**976,619,821**						
PRIVATE SECTOR OPERATIONS									
15	Deba-Midroc Cement Factory	16-Apr-09	39,882,752	100%	3.09	4	NON-PP/NON PPP	8.4	15-Mar-18
16	Ethiopian Air Lines	23-Mar-11	27,998,968	96.68%	3.77	4	NON-PP/NON PPP	6.4	14-Dec-17
17	Ethiopian Airlines	14-Dec-16	116,068,395	100%	3	3	NON-PP/NON PPP	0.7	31-Dec-28
	PRIVATE SECTOR TOTAL		**183,950,115**						
TOTAL INVESTMENT OPERATIONS			**1,160,569,936**						
TRUST FUNDS									
18	Africa Bamboo	19-Mar-14	532,550	6.61%	3	3	NON-PP/NON PPP	3.5	31-Dec-17
19	AWF/NEPAD Baro Akobo Sobat	2-May-13	2,060,000	61.76%	3	3	NON-PP/NON PPP	4.3	31-Dec-17
20	Support to Institutional Strengthening in Gender Mainstreaming for Infrastructure Sector	1-Apr-15	230,925	30.00%	3	3	NON-PP/NON PPP	2.4	30-Jun-17
21	ClimDev Fund for Adaptation to Climate Change in Ethiopia	22-Jun-15	795,580	8.00%	3	3	NON-PP/NON PPP	2.2	30-Jun-17
22	Marketing and Service Chain Support for Total Sanitation in Arba Minch	11-Jun-15	973,536	**6.45%**	3	3	NON-PP/NON PPP	2.2	30-Sept-19
TOTAL TRUST FUNDS			**4,592,591**						
TOTAL PORTFOLIO			**1,165,162,527**						

* Grant component

Appendix IV: Table of Key Energy Projects Financed by the Bank and Other Development Partners in the Country

Project/Framework	Development Partner	Amount of finance x1,000	Sector Contribution
Rural Electrification-I	AfDB	UA 34,230	Creating electricity access to 36 rural Woreda towns in seven administrative Regions, to improve the livelihood of rural population and economic development in the country,
Rural Electrification II	AfDB	UA 87,200	Creating electricity access to rural population to 335 towns and villages in Amhara, Oromiya and Southern regions to improve the livelihood of rural population and economic development in the country
Ethiopia-Djibouti Interconnection project (Construction of 283 km 230 kV line)	AfDB	UA 59,400	Multinational power Transmission Interconnection, to enable countries to exchange (export/import) electric power for mutual economic benefit and reduction the fossil fuel generation by importing/exporting clean energy
Electricity Transmission System Improvement project(Construction of 943 km 230 kV lines & 21 subsations)	AfDB	UA 151,750	Improve access to electricity for the rural population, improve transmission capacity and reliability of power supply to businesses and manufacturing firms in urban areas
Ethipia-Kenya Electricity Highway project (Construction of 1045 km, 500 kV HV DC line)	AfDB	UA 150,000	Multinational power Transmission Interconnection, to enable countries to exchange (export/import) electric power for mutual economic benefit and reduction the fossil fuel generation by importing/exporting clean energy
Sululita-Bahir Dar-D.markos-Sululta 400kV Transmission line	China Exim Bank		Improving the power transfer capacity & relaibility of high voltage transmission network
Generation (Amertin Neshi Hydro Electric power project, 100 MW)	China Exim Bank	USD 117,000	Increasing the Country's hydro generation capacity, to satisfy the growing energy supply demand throughout the country
Generation (Gilgel Gibe II Hydro Electric power project, 420 MW)	Govt. Italy & EIB	EUR 270,000 (220,000, 50,000)	Increasing the Country's hydro generation capacity, to satisfy the growing energy supply demand throughout the country
Ethiopia-Sudan Interconnection project	World Bank	USD 41,000	Multinational power Transmission Interconnection, to enable countries to exchange (export/import) electric power for mutual economic benefit and reduction the fossil fuel generation by importing/exporting clean energy
Rural Electrification (EAREP I & II)	World Bank	USD 180,800	Electrification of 265 towns through grid expansion and additional villages through mini off grid system and development of productive use of energy
Transmission & Substations Rehabilitation & Upgrading project	World Bank	USD 90,000	Rehabilitation & upgrading of the existing transmission lines & substations in Addis Ababa area & other regions to enhance their capacity and improve the power supply situation
Rural Electrification	Kuwait	USD 35,000	Electrification of 27 towns, improvement of 4 substations and construction of 3 transmission lines in Afar Region to create access to electricity & improve the livelihood of rural population
Rural Electrification	BADEA-I	USD 3,600.00	Electrification of 44 towns in two regions, Amhara and SNNP region to create access to electricity &improve the livelihood of rural population
Transmission (132 kV line and substation for SAWLA-Key Afer)	BADEA & OPEC	USD: 9,000 - (9,000.0 & 20,000.00)	Constructing the 132 KV transmission line and associated substations to improve power supply to Urban and Rural areas in southern part of the country
Rural Electrification	India	USD 65,000.00	Electrification of 27 towns in Hagare-Mariam Mega area to create access to electricity & improve the livelihood of rural population

Appendix V: Project Location Map