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AFRICAN DEVELOPMENT FUND

PROJECT: IRINGA-SHINYANGA TRANSMISSION LINE PROJECT
COUNTRY: TANZANIA

PROJECT APPRAISAL REPORT

Date: 30 MAY 2010

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Currency Equivalents
As of 30th April 2010

UA 1	=	1.51USD
UA 1	=	1.14 EURO
UA 1	=	2,032.50 TZS

Fiscal Year

1 July – June 30

Weights and Measures

1metric tonne	=	2204 pounds (lbs)
1 kilogramme (kg)	=	2.200 lbs
1 metre (m)	=	3.28 feet (ft)
1 millimetre (mm)	=	0.03937 inch (“)
1 kilometre (km)	=	0.62 mile
1 hectare (ha)	=	2.471 acres
1 Kilovolt (kV)	=	1000 volts
1 Kilowatt (kW)	=	1000 watts
1 Kilovolt ampere (kVA)	=	1000 volt ampere
1 Megawatt (MW)	=	1000 kW
1 Gigawatt (GW)	=	1000 MW
1 Megavolt ampere (MVA)	=	1000 kVA
1 Kilowatt hour (kWh)	=	1000 watt hour

ABBREVIATIONS AND ACRONYMS

ADB	African Development Bank
AfDB	African Development Bank
ADF	African Development Fund
AFD	Agence Française de Développement
CAGR	Compounded Annual Growth Rate
COP	Chief Procurement Officer
COSS	Cost of Service Study
DPs	Development Partners
DSCR	Debt Service Coverage Ratio
EAPP	East African Power Pool
EIB	European Investment Bank
ENPV	Economic Net Present Value
EMU	Environmental Monitoring Unit
EPA	Environmental Protection Agency
EIRR	Economic Internal Rate of Return
ENPV	Economic Net Present Value
ESI	Electricity Supply Industry
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EWURA	Energy and Water Utilities Regulatory Authority
FC	Foreign Cost
FE	Foreign Exchange
FOCL	Fibre Optic Communication Line
FIRR	Financial Internal Rate of Return

FNPV	Financial Net Present Value
FRP	Financial Recovery Plan
FY	Financial Year
GoT	Government of the United Republic of Tanzania
GEP	Generation Expansion Plan
GDP	Gross Domestic Product
GPN	General Procurement NOtice
GWh	Gigawatt hour
HV	High Voltage
HVTL	High Voltage Transmission Line
ICB	International Competitive Bidding
IDC	Interest During Construction
IPP	Independent Power Producer
ICS	Interconnected System
IDA	International Development Association
JAST	Joint Assistance Strategy for Tanzania
JICA	Japan International Co-operation Agency
LC	Local Cost
LRMCS	Long Run Marginal Cost of Supply
LV	Low Voltage
MCM	Million Cubic Meters
MKUKUTA	Kiswahili acronym for the National Strategy for Growth and Reduction of Poverty
MoFEA	Ministry of Finance & Economic Affairs
MIS	Management Information System
MV	Medium Voltage
NSGRP	National Stategy for Growth & Reduction of Poverty
O&M	Operation and Maintenance
p.a.	Per Annum
PA	Project Area
PAPs	Project Affected Persons
PCR	Project Completion Report
PIU	Project implementation Unit
PPA	Power Purchase Agreement
PPER	Project Performance Evaluation Report
PSMP	Power System Master Plan
QPR	Quarterly Progress Report
R&M	Repairs and Maintenance
RAP	Resettlement Action Plan
REA	Rural Energy Agency
SAPP	Southern Africa Power Pool
SMEs	Small and Medium Enterprises
TANESCO	Tanzania Electric Supply Company
TVET	Technical, Vocational Education and Training
TZFO	Tanzania Field office
UA	Unit of Account
UEAP	Universal Electricity Access Program
UNDB	United Nations Development Business
UNECA	United Nations Economic Commission for Africa
TPP	Thermal Power Plant
WACC	Weighed Average Cost of Capital
ZTK	Zambia Tanzania Kenya Interconnector

LOAN INFORMATION

Client's information

BORROWER: United Republic of Tanzania

EXECUTING AGENCY: **Tanzania Electric Supply Company** (TANESCO)

Financing Plan (millions)

Sources of financing	***Amount (UA)***	**Instrument**
IDA	97.50	Loan
EIB	88.58	Loan
JICA	42.72	Loan
ADF	45.36	Loan
KOREA	23.75	Loan
GoT/TANESCO	12.57	Equity
Total project cost (pre-IDC)	**310.49**	
Add: IDC – financed by TANESCO	6.69	Equity
Total Project Cost	**317.18**	

ADF's key financing information

Loan currency	Unit of Account (UA)
Commitment fees	0.50%
Service charge	0.75%
Tenor	50 Years
Grace period	10 Years
FIRR, FNPV @ % real (Base case)	19.6%, US$383.4 million
EIRR,ENPV @ % real (Base case)	35.6%, US$ 2,122 million

Timeframe - Main Milestones (expected)

Concept Note approval	March, 2010
Project approval	October, 2010
Effectiveness	April, 2011
Last Disbursement	July, 2014
Completion	December, 2013
Last repayment	January, 2060

PROJECT OVERVIEW

1. PROJECT OVERVIEW

The Iringa-Shinyanga Transmission Line Project involves the construction of an overhead line to reinforce the entire backbone transmission grid system of Tanzania. Most of the line stretches will run parallel to the existing 220 kV line, with only minor variations in areas where alternative alignments have been proposed due to the topography of the terrain. The planned line is a 400 kV line and will have a length of approximately 670 km. It will interconnect four substations (S/S) at the Iringa, Dodoma, Singida and Shinyanga towns. The project is expected to be completed by the end of 2013 at an estimated cost UA 314 Million.

2. NEEDS ASSESSMENT

The energy needs for Tanzania are enormous given that only about 14% of the population, mainly in urban areas, are connected to the national grid. In response, the Government of Tanzania (GoT) has embarked on a program of accelerated electrification with plans for TANESCO to connect 100,000 customers per year. At the same time, the Northwest part of Tanzania is experiencing fast-paced demand growth between 8% and 10% annually due to increased economic activity, particularly in the mining sector. The existing 220kV line has already reached its technical limits and cannot handle this expected demand growth. In this context, the proposed project is of critical importance and forms part of TANESCO's short-term strategy for national grid transmission line reinforcement. Furthermore, without the line, industrial and household consumers in the concerned regions will continue to rely on thermal generating units to meet their electricity needs, thereby exacerbating the negative impacts of climate change.

3. BANK'S ADDED VALUE

The Bank considers the support of infrastructure development, especially within the power sector, as a pillar of its strategy in the country. The support of development partners has been sought for this project and it is included in the JAST (2006-2010) as part of the strategy to increase access to electricity and meet demand for power nationally. The Bank has been active in Tanzania since 1968 and over that period, has acquired extensive knowledge of the Tanzanian power sector issues. Considering the scale of the project, the Bank's considerable power sector experience in infrastructure will be pivotal so as to avoid some of the pit falls that may be encountered at the implementation stage. The Bank continues to assist the GoT in its efforts at restructuring the electricity sub-sector to ensure projects such as this are developed sustainably and in compliance with international best practice.

4. KNOWLEDGE MANAGEMENT

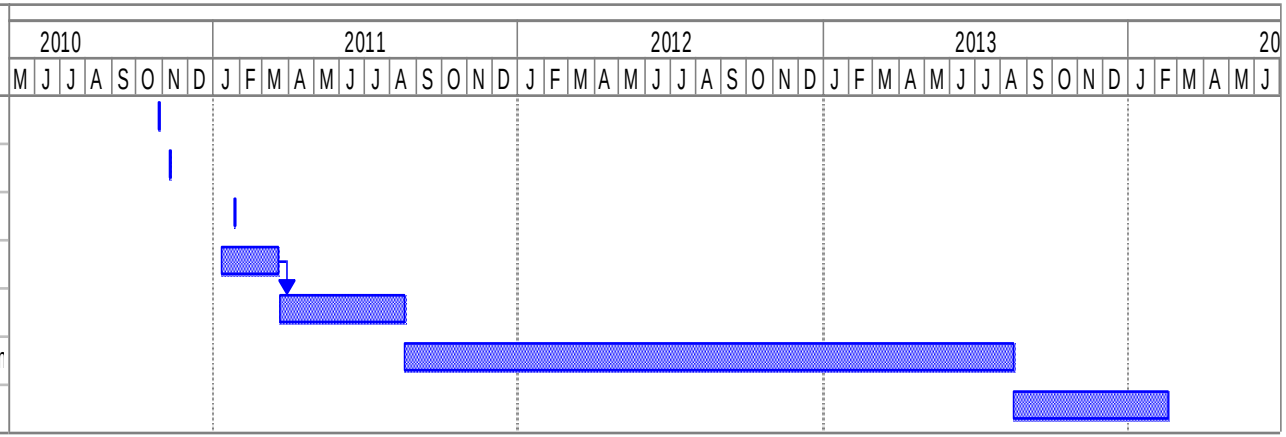
The construction and consultancy contracts for the project will include specific provisions to ensure the training of TANESCO engineers. This technology transfer component is particularly important for this project as it is the first 400kV double circuit transmission line to be constructed in Tanzania. Similar technologies are likely to be used for other projects in the near future, such as for the interconnections with Kenya and Zambia (refer to Annex V). Technical assistance activities included in the project will support TANESCO in the areas of Project Supervision and Management. It will also assist with the timely implementation and monitoring of the Environmental and Social Management Plan and the Resettlement Action Plan (RAP)

Result-based Logical Framework					
•					
Hierarchy of Objectives	**Expected Results and Schedule**	**Reach (Beneficiary)**	**Performance Indicators**	**Indicative Targets &Schedule (Availability of base line data)**	**Assumptions/risks**
1 SECTOR GOAL 1.1 The Sector goal is to contribute to increase, in a sustainable manner, the access of the population of Tanzania to affordable electricity services to support economic growth and reduce poverty.	**IMPACTS (Long Term Results)** 1.1 Contribution of the energy sector to GDP is maintained to at least the FY2008/09 level of 15 %.	All Economic Sectors of Tanzanian economy	1.1 Increase in electricity access rates 1.2 Reduced technical and commercial losses	1.1 Increase in Electricity Access rates from 11% in 2010 to 15% in 2013 and 25% in 2020 1.2 Reduction in the total (transmission and distribution) losses from 22.5% in 2009 to 13% in 2015	**Risk Indicators** 1.1 Commitment of the Tanzanian Authorities to a sustained development agenda in he country 1.2 Adequate macro-economic policies and improved legal and institutional framework in the electricity sector. 1.3 Rural electrification plans are attuned with the implementation strategy of the Transmission Line
2 PROJECT OBJECTIVES 2.1 Provide adequate transmission infrastructure to link existing and future generation sources located in the South and Southwest of Tanzania to the load centers in the Mwanza and Arusha regions in the North. 2.2 Facilitate regional power trade in the future especially with Kenya to the North and Zambia to the South	**OUTCOMES (Medium Term Results)** 2.1 Reinforcement of national power system back-bone 2.2 Increased availability of reliable power to the economy and electricity users in the country. 2.3 Regional economic cooperation and development.	Industrial, agricultural, commercial and domestic consumers	2 2.1 Transmission capacity between Iringa and Shinyanga. 2.2 Number of new customers connected to the grid and access rates 2.3 Approval by NEMC of ESIA and RAPs and compliance of ESIA and RAPs with ADB requirements 2.4 Regional power trade with EAPP and SAPP facilitated	2 2.1 400kV Transmission lines installed by 2012 with capacity to transfer upto 500 MW at 220 kV level and 1000 MW at 400 kV level in the future. 2.2 500,000 new connections to the grid by 2018 2.3 Positive variance between the number of affected persons compensated and persons identified in the ESIA report	**Risk Indicators** 2.1 Generation capacity not is expanded according to national power master plan. 2.2 GOT/TANESCO inability to meet financial obligations to the project in a timely manner 2.3 Lack of proper donor coordination 2.4 Delays in the generation options from Zambia through the ZTK interconnector or from Ethiopia via Kenya.

				2.4 200 MW power traded by 2017.	
3 <u>ACTIVITIES AND RESOURCES</u> 3.1 Supply and installation of equipment and materials for construction of transmission lines and substations **Financial Resources** 3.1 IDA : 97.50 Million UA 3.2 EIB : 88.58 Million UA 3.3 ADF 45.36 Million UA 3.4 JICA : 42.72 Million UA 3.5 Korea : 23.75 Million UA 3.6 GoT/TANESCO : 12.57Million UA 3.7 IDC (TANESCO): 6.69 Million UA **Total : 317.18 Million UA** **Human resources** 3.8 Consultant	**OUTPUTS (Short Term Results)** 3.1 Construction of 667 km of 400 kV double circuit transmission line, provisions for rural electrification and procurement of Distribution material for connection of new customers 3.2 Extension of four Substations at Iringa, Dodoma, Singida and Shinyanga	Governments Electricity company Populations Industry Commerce Handicraft	3.1 Length of transmission lines erected 3.2 Number of substations extended	3.1 667 km of transmission lines constructed by 2013 3.2 4 Substations extended by 2012	3.1 Counterpart funds are available and compensation/resettlement implemented in a timely manner. 3.2 Timely approval and disbursement of funds by all co-financiers.

IRINGA-SHINYANGA TRANSMISSION LINE PROJECT – PROJECT TIME FRAME

ID	Task Name
1	Loan Approval
2	SPN
3	Loan Signature
4	Bidding period
5	Evaluation, Contract award and mobilization
6	Manufacturing , installation and commissionnir
7	PCR



REPORT AND RECOMMENDATION OF THE MANAGEMENT OF THE ADB GROUP TO THE BOARD OF DIRECTORS ON A PROPOSED LOAN TO TANZANIA FOR THE IRINGA-SHINYANGA TRANSMISSION LINE PROJECT

Management submits the following Report and Recommendation on a proposed ADF loan for UA 45.36 million to finance the Iringa-Shinyanga Transmission Line Project in Tanzania.

I – STRATEGIC THRUST & RATIONALE

1.1. *Project linkages with country strategy and objectives*

1.1.1 The project is in line with the Joint Assistance Strategy for Tanzania (JAST) and the Joint Programme Documents (JPD) which include the Bank Group's Strategy in Tanzania for 2006-2010. These documents draw from Tanzania's National Strategy for Growth and Reduction of Poverty (NSGRP) popularly referred to as MKUKUTA. The project is specifically in line with MKUKUTA clusters 1(Growth and Reduction of Income Poverty) and 2 (Improvement of Quality of Life and Social Well-being). In particular, Goal 6 of Cluster 1 emphasises the need for the provision of reliable and affordable energy to consumers as a key development focus. Thus, increased availability and reliability of electricity in the Northwestern part of the country will strengthen the country's economic growth especially the expansion of the mining sector as well as Government's poverty alleviation efforts. Indirect benefits will accrue from the enhanced electricity supply to educational and health facilities in rural areas, water schemes as well as to industrial and commercial activities. The enhanced electricity supply will also improve conditions for development by private sector operators of commercial activities in the Northwest provinces of Tanzania. The project will also provide an important conduit for power trade within the Eastern Africa Power Pool (EAPP) and Southern Africa power Pool (SAPP).

1.1.2 Key cluster strategies make provisions for energy investment projects to be developed in accordance with the Government's Power System Master Plan (PSMP). The PSMP is also required to be updated regularly. Interconnection of isolated regions is a key feature of the PSMP in order to promote social and economic development and achievement of the Millennium Development Goals. This project is therefore consistent with the objectives of Tanzania's PSMP as well as the MKUKUTA goals.

1.1.3 The project is designed to enable the transmission of adequate power to meet growing demand in Tanzania as well as meet the requirements of planned interconnection with neighbouring countries. As such it has a regional dimension and is in line with two priority areas of intervention of ADF XI cycle, namely infrastructure and regional integration. Most neighbouring countries experience power shortages during the dry season and some of them have resorted to supplying their domestic demand using expensive fossil fuels which also contribute to high gas emissions.The Bank is also financing a similar 400 kV transmission project in Kenya (Mombasa – Nairobi Transmission Line) and will draw lessons from the Kenyan experience for application in this operation in Tanzania.

1.1.4 Tanzania is blessed with diverse energy sources including biomass, hydropower, natural gas, coal, geothermal, solar and wind power, much of which is unexploited. The country's main installed generation capacities are based on hydropower (56 percent[1]) and natural gas (34 percent). According to Tanzania Electric Supply Company Limited's (TANESCO) short to medium term generation expansion plan (up to 2018) the majority (60 percent) of the planned generation capacity additions are expected to be based on natural gas, wind and hydropower. These will predominantly be located in the South of the country.

[1] Total hydrogenation as at May 2010 is 561 MW

1.1.5 Tanzania's energy sector comprises a number of stakeholders among which are government and non-government institutions. The Ministry of Energy and Minerals (MEM) is on the whole, responsible for energy related matters including electrical power, renewable energy, coal, gas and petroleum. The electricity sub-sector is dominated by a single vertically integrated national utility, TANESCO which is 100% government owned. TANESCO completed its PSMP in 2008 and further updated it for generation activities in August 2009. This PSMP provides a demand and supply analysis for the sector. Based on anticipated demand of the population and economy of Tanzania for the period up to 2033, and a least cost supply response to this demand, the PSMP anticipates the energy sales requirements for Tanzania to be about 9,646GWh in 2018 and 30,214 GWh in 2033. The long-term growth rate of demand is expected to be an average of 7.9 percent per annum. The national peak installed capacity to meet the demand should be in the range of 1,925 MW in 2018 and 6,047 MW in 2033.

Table 1: Electricity Needs Assessment (2008 – 2033)

	2008 Actual	**2008 Unconstrained**	**Increase**	**2018**	**Annual growth**	**2033**	**Annual growth**
Grid Sales (GWh)	3,128	3,289	5%	9,646	11.4%	30,214	7.9%
Losses (GWh)	812	854	5%	1,531	6.0%	4,297	7.2%
Net Generation (GWh)	3,940	4,143	5%	11,177	10.5%	34,511	7.8%
National Cumulative Peak Demand (MW)	**694**	**729**	**5%**	**1,925**	**10.2%**	**6,047**	**7.9%**

Source: Power System Master Plan Update 2009, SNC Lavalin

1.1.6 The Government's short to medium term generation program as presented in the PSMP entails the completion of the Tegeta generating plant (45 MW), completion of the Mwanza diesel plant (60 MW), installation of the Ubungo gas turbine plant (100 MW), the Singida wind farm (50 MW), the Kiwira thermal plant (200 MW) and the Kinyerezi gas turbine plant (240 MW). Together, these additional generating units will increase the country's current installed generation capacity of (1,003MW) to over 1,871 MW by 2015. The proposed transmission line project will contribute to the security and reliability of the grid.

1.1.7 The PSMP also indicates that the Northwest part of Tanzania will be experiencing a rapid increase in electricity demand of about 8 to 10 percent annually[2]. This is primarily due to expanding economic activity in the resource rich area where approximately 12 mines (gold, copper, nickel, etc) are proposed to begin operations in the Northwest of the country. In light of the lack of generation options in the North, and overloading of the current 220kV single circuit Iringa-Shinyanga transmission line, the PSMP estimates a current shortage of electricity in the North of the country.

1.2. *Rationale for Bank's involvement*

1.2.1 The vast majority of people in Tanzania do not have access to electricity, and the rural population is nearly completely reliant on biomass and other traditional sources of energy. It is estimated that only 14% of the population, mainly in urban areas, is connected to the national grid. In response, the Government of Tanzania is committed to connecting 100,000 customers per year including supply of electricity to local communities thus safeguarding rural population from continued exclusion from the grid and arresting the high levels of deforestation. TANESCO, through the government and with the support of the energy sector development partners, intends to reinforce its existing 220kV transmission line through the proposed Iringa – Shinyanga 400kV Transmission Line project. In addition to power supply in the starved regions of the North, the proposed project will reduce frequency of unplanned outages, improve voltage conditions and

[2] The PSMP indicates that the share of electricity consumption in the North and Northwest will increase to about 30 percent of total consumption in the interconnected system over the next several years.

reduce power system losses. It will also enable TANESCO procure distribution materials to connect 500,000 new customers by 2018.

1.2.2 The proposed project is in line with the Bank's efforts to support the development of Tanzania's power sector. ADF has provided support to the energy sector of Tanzania for the last several years. Recent engagements (Electricity IV and V) have been predicated on improving sustainable supply of electricity to economic sectors and households in rural towns, district headquarters and peri-urban areas in Mwanza, Shinyanga, Arusha, Kilimanjaro and Dar Es Salaam Regions. These investments are also aimed at contributing to sector reform and financial recovery of TANESCO. It is expected that the successful implementation of this new Project, combined with the ongoing Electricity IV and V will contribute to the security, reliability and access to grid based power supply and thus support the economic growth of the country.

1.2.3 Tanzania is strategically located to act as a power transit country between Southern Africa Power Pool (SAPP) and Eastern Africa Power Pool (EAPP). Specifically, it will facilitate energy exchange between a major exporter (Zambia) and a major consumer (Kenya). Therefore, the proposed project will help operationalize inter-regional electricity trade particularly after completion of other Bank supported regional projects such as the Ethiopia-Kenya interconnection, which is at an advanced stage of preparation, and the Zambia-Tanzania-Kenya interconnection. Both are planned at the 400kV level.

1.3 *Donor Coordination*

1.3.1 The Development Partners (DPs) in Tanzania are organized in various working groups; all coordinated at *Development Partner Group (DPG)* comprised of all Heads of Missions. Within DPG, there are sub-groups dealing with specific sectors (such as power, health and water) and thematic issues. Development Partners supporting the Government through General Budget Support (GBS) are coordinated through *Performance Assessment Framework (PAF)*. Both the DPG and PRBS frameworks sub-working group have regular monthly meetings to review progress on various issues pertaining to their support to Tanzania.

1.3.2 The Tanzania Field Office (TZFO) is very much part of the aid architecture in Tanzania, having served as Chair of the General Budget Support (GBS) for 2009-2010. TZFO is an active member of the DPG-Power Working Group and is engaged in regular donor meetings for sector policy dialogue with Government, sector development support issues and sector performance assessment. The active development partners in the energy sector, all of whom are members of the DPF-Power, include the World Bank (WB), Japan International Cooperation Agency (JICA), European Union (EU), United States of America Millennium Challenge Cooperation (MCC), Economic Development Cooperation Fund (EDCF – Korea), Embassies of Norway, Sweden and the Netherlands, all of who are active partners in the energy sector. The active participation of the Tanzania Field Office in these dialogue meetings has greatly facilitated alignment of Bank's interventions with the efforts of other development partners, and allowed for regular sharing of information and lessons learnt. The DPG-Power Group also organizes a Joint Energy Sector Review (JESR) through which the donor partners agree on assessment criteria including statistics/data information system on access, generation etc. The review process encompasses a workshop with all stakeholders and finalization of assessment of performance. Appendix III shows details of work done by the various development partners active in Tanzania.

II – PROJECT DESCRIPTION

2.1. Project components

2.1.1 Development of Power Transmission Network: In order to avoid installing excess transmission capacity and reduce initial investment cost, the development of the project is divided into two (2) phases. Phase I of the project involves the construction of a 667 km long, 400 kV double-circuit backbone transmission interconnection, including the Fiber Optic Communication

Line (FOCL) and the Shield Wire System (SWS). The FOCL will serve as communication medium for power system management and control (Supervisory Control and Data acquisition) and could also serve as national communication carrier to the country. It also involves the expansion of the associated 220kV substations at Iringa, Dodoma, Singida and Shinyanga. Furthermore, at this phase, the project will be operated at 220 kV level with a transmission capacity of 550 MW. The project components are as follows:

Table 3: Project components

No.	**Component Name**	**Est. Cost (UA million)** (including contingencies**)**	**Component description**
A.	Line section Iringa-Dodoma	88.58	225 km, double circuit 400 kV line between Iringa and Dodoma (both circuits strung)
B.	Line section Dodoma - Singida	85.43	217 km, double circuit 400 kV line between Dodoma and Singida (both circuits strung)
C.	Line section Singida _ Shinyanga	88.58	225 km, double circuit 400 KV line between Singida and Shinyanga (both circuits strung)
D.	Substations	23.75	Iringa substation : two (2) 220 KV feeders; Dodoma substation : five (5) 220 KV feeders; Singida substation : five (5) 220 kV feeders; Shinyanga substation : three (3) 220 kV feeders and Shunt reactor : 360 MVA
E	Procurement of Distribution Material	2.55	Procurement of Distribution material to support 500,000 new customers by 2018
F	Technical Assistance	8.92	• Consulting services • Capacity building to TANESCO
G	Compensation & Environment	11.97	Mitigation measures, compensation, and land acquisition
H	Project Audit	0.09	
	Total project cost	310.49	
	Interest During Construction (IDC)	6.69	
	Total financing requirement	317.18	

2.1.2 Phase II will comprise a system upgrade to 400 kV level for all associated substations (Iringa, Dodoma, Singida and Shinyanga) with the addition of 720 MVA shunt-reactor capacity. The planned upgrades will allow an increase in the transfer capacity to 1,000 MW. The implementation of the upgrade is scheduled for 2020 when the load on the line is expected to warrant that level. The portion of the project presently under consideration for financing by DPs consists of Phase I only.

2.1.3 Project Supervision and Management**:** TANESCO has already recruited a consultant for preparation of prequalification documents for contractors, evaluation of submissions for prequalification, the bidding documents, evaluation of bids and assistance during contract negotiation. Additionally, consultancy services for project supervision and management will be procured to oversee the design, construction and general coordination of project implementation. Even though the project comprises several lots, each to be financed by a different donor, the TOR for the consultant will encompass all responsibilities for the supervision and management of the lots collectively. The consultant will also supervise the implementation of environmental mitigation measures which include a) orderly payment of compensation to Project Affected Persons (PAPs) and b) monitoring of the mitigation measures.

2.1.4 Capacity building – Training and capacity building will be provided to strengthen the capacity of TANESCO personnel to operate and maintain the 400 kV systems according to standard operation procedures. The contractors for both transmission line and substations along with the consultant will be responsible for developing the training program. The ToR's for both the

contractor and consultant will specify the training component each will be responsible for. Given that this will be the first line operated at the 400 kV level in the country, the training program will concentrate on operation and maintenance of substations of similar voltage. However, design, erection testing, and commissioning of high voltage lines will also be included in the training program.

2.1.5 Project Audit – The Audit service will also be procured for auditing the project accounts annually.

2.1.6 Compensation – TANESCO and GOT will be responsible for compensation of those persons whose land, properties, crops and trees are affected by the project.

2.2. Technical solution retained and alternatives explored

2.2.1 The feasibility study investigated five options and compared their outcomes based on technical and economic criteria. TA1.4 was ranked as the best alternative hence, was retained for implementation.

2.2.2 The voltage level of 400 kV was considered based on the recommendation of the Tanzanian Power System Master Plan (PSMP) in view of the need to strengthen the power system backbone within Tanzania so as to make the network adequate for regional interconnection. Tanzania shall in the near future be interconnected with Zambia and Kenya and the planned Ethiopia-Kenya interconnection will also be rated 400 kV.

Table 4: Project alternatives considered and reasons for rejection

Project alternatives considered and reasons for rejection		
Alternative name	**Brief description**	**Reasons for rejection**
TA1.1	**400 kV AC line IRINGA – DODOMA- SINGIDA – SHINYANGA** Phase 1: 400 kV double circuit transmission line with single circuit strung, operated at 400 kV. Phase 2: implementation of the second circuit and installation of additional transformer capacity.	Technical: This alternative only partially satisfies the technical criteria, i.e. while it satisfies the power transfer capacity requirement up to year 2020, it will not satisfy the N-1 criteria (1), by the virtue of the fact that only one circuit is strung in the first phase. Economical: It is not the best alternative with respect to EIRR and Present value of costs.
TA1.2	**400 kV AC line IRINGA – DODOMA - SINGIDA – SHINYANGA**: Phase 1: 400 kV double circuit transmission line with both Circuits strung, operated at 400 kV. Phase 2: installation of additional transformer capacity	Technical: This alternative fully satisfies the technical requirements (power transfer capacity and N-1 criteria) but is not the best alternative with respect to economic indicators. (most expensive project with lowest EIRR)
TA1.3	**400 kV AC line IRINGA – DODOMA - SINGIDA – SHINYANGA**: Phase 1: 400 kV double circuit transmission line with single circuit strung, operated at 220 KV. Phase 2: implementation of the second circuit and system upgrade to 400 KV.	Technical: This alternative does not satisfy any of the two main technical requirements. Economically also it is ranked 4th out of the 5 alternatives.
TA1.5	**400 kV AC line IRINGA – DODOMA - SINGIDA – SHINYANGA** Phase 1: Construction of a 400 kV double circuit line with both circuits strung, operated at 220 kV on line section Iringa – Dodoma-Singida and construction of a 400 kV double circuit line with one circuit strung, operated at 220 kV on line section Singida – Shinyanga. Phase 2: Stringing of 2nd circuit on Singida – Shinyanga transmission line section and System upgrade to 400 kV	Technical: This alternative does not satisfy any of the two main technical requirements. Economically also it is ranked 2nd out of the 5 alternatives.

(1) N-1 criteria: In case of disconnection of one circuit, the remaining circuit should be able to carry the load without loss of stability

2.3. Project type

The proposed project is a standalone project. Installed in parallel to the existing transmission line, the proposed new transmission line will considerably increase the power transfer capacity from the existing and future generating sources in the south to the load centres in the north and northwest of Tanzania.

2.4. Project cost and financing arrangements

The project cost excluding interest during construction is estimated at UA 307.34 million (USD 471.41million), comprising foreign exchange costs (86.69%) of UA 269.26 million (USD 408.80 million) and local cost (13.31%) of UA 41.33 million (USD 62.74 million). The summary of the cost estimates by component, sources of financing and by category of expenditure are shown in tables 5, 6 and 7 below. Additionally, table 8 shows AfDB and JICA co-financing schedule for "lot 2" of the project (line section from Dodoma to Singida). Interest during construction is estimated to be UA 6.69 million and is to be financed by TANESCO and GOT.

Table 5: Project cost estimate by component in million USD and UA equivalents

No.	Component	In Million USD			In Million UA			% FC
		FC	LC	Total	FC	LC	Total	
A	Transmission Lines	313.36	34.82	348.17	206.39	22.93	229.33	90.00
B	Distribution Material	3.38	-	3.38	2.23	-	2.23	100.00
C	Substations	30.57	0.95	31.52	20.14	0.62	20.76	97.00
D	Technical Assistance	11.00	2.00	13.00	7.25	1.32	8.56	84.62
E	Compensation & Env. Mitigation Costs	-	18.18	18.18	-	11.97	11.97	0
F	Project Audit	-	0.14	0.14	-	0.09	0.09	0
	Base Cost	**359.70**	**56.27**	**415.97**	**236.00**	**36.94**	**272.94**	
	Physical Contingency (10%)	34.73	3.58	38.31	22.88	2.36	25.23	
	Price Contingency (4% F/C, 5%L/C)	14.33	2.80	17.13	9.44	1.84	11.28	
	Total	408.76	62.64	471.40	269.23	41.26	310.49	

Table 6: Sources of financing in million USD and UA equivalents

No.	FC	LC	Total	FC	LC	Total	% of financing
	In Million USD			In Million UA			
IDA	132.37	15.67	148.03	87.18	10.32	97.50	31.40
EIB	120.93	13.57	134.49	79.65	8.94	88.58	28.53
ADF	62.18	6.69	68.87	40.96	4.41	45.36	14.61
JICA	58.31	6.54	64.85	38.41	4.31	42.72	13.76
KOREA	34.97	1.09	36.06	23.03	0.72	23.75	7.65
GoT/TANESCO	-	19.09	19.09	-	12.57	12.57	4.05
TOTAL	**408.76**	**62.64**	**471.40**	**269.23**	**41.26**	**310.49**	**100.00**

Table 7: Total Project cost breakdown by component in millions USD and UA equivalent

No	Component	In Million USD			In Million UA		
		FC	LC	Total	FC	LC	Total
	A. Transmission Lines						
1	Line Section Iringa - Dodoma	120.93	13.57	134.49	79.65	8.94	88.58
2	Line Section Dodoma - Singida	116.63	13.08	129.71	76.82	8.62	85.43
3	Line Section Singida - Shinyanga	120.93	13.57	134.49	79.65	8.94	88.58
5	Substations	34.97	1.09	36.06	23.03	0.72	23.75
	Total EPC Contract	393.45	41.31	434.76	259.15	27.21	286.36
4	B. Distribution Material	3.87	-	3.87	2.55	-	2.55
5	C. Technical Assistance	11.44	2.10	13.54	7.54	1.38	8.92
6	D. Compensation and Environment	-	19.09	19.09	-	12.57	12.57
7	E. Project Audit	-	0.15	0.15	-	0.10	0.10
Project Cost (A+B+C+D+E)		408.76	62.64	471.40	269.23	41.26	310.49

Table 8: AfDB/JICA co-financing expenditure schedule in millions USD and UA equivalent

Source	In Million USD					In Million UA				
	Year					Year				
	2011	2012	2013	2014	Total	2011	2012	2013	2014	Total
ADF	17.22	17.22	24.11	10.33	68.87	11.34	11.34	15.88	6.80	45.36
JICA	16.21	16.21	16.21	16.21	64.85	10.68	10.68	10.68	10.68	42.71
	33.43	33.43	40.32	26.54	133.72	22.02	22.02	26.56	17.48	88.08

2.5. Project's target area and population

2.5.1 The project transverses the entire country from south to north (See map overview in Appendix IV). The Iringa to Dodoma line in the southern region of Tanzania starts from Igumbilo in Iringa Municipality to Michese in Dodoma Urban. The Dodoma to Singida line in the central part of the country starts from Michese to the Singida Substation. Finally, the Singida to Shinyanga line route starts towards the north starts at the Mayoni District and terminates at the Shinyanga sub station. Along the projects line routing, there are existing electricity loads in the villages ranging from households to health centres, small shops, bars, and restaurants. The consultants are currently working to determine the best technological option available to be used as drop-off points along the Right of Way (ROW).

2.5.2 The main project beneficiaries will therefore include (i) TANESCO as the project facilities will enable TANESCO to evacuate power from planned projects; (ii) households, industrial, mining and commercial electricity consumers to be connected to the national grid will also benefit from the new supply and increased reliability of service as a result of the project; the project will also benefit the rural population by facilitating the work of the Rural Energy Agency (REA)

2.6. Participatory process for project identification, design & implementation

2.6.1 Participation in identification was embedded in the government's annual budget programming process. Investments in power generation and transmission are a priority for the current National Strategy for Growth and Reduction of Poverty (NSGRP). It is also a high priority item in TANESCO's Capital Investment Plan.

2.6.2 At design and preparation stage, views of the various stakeholders were captured through extensive consultations undertaken as part of the ESIA studies, in compliance with Tanzania's Environmental Management Act of 2004. The objective was to ensure all issues concerning the proposed project have been covered. Consultations included stakeholders in relevant government ministries, communities, Districts, national and international NGOs and civil society. Awareness

campaigns and participatory assessments such as discussions with local leaders, public village meetings and interviews with focus groups were held.

2.6.3 Results of the consultations have been incorporated into the project design. Issues were discussed and consensus were reached on land acquisition procedures, compensation in terms of valuation and timeliness for buildings and crops, the prospect of increased spread of HIV/AIDS and possibility of connecting villages along the line, among other issues. Although villagers are concerned about losing their properties, especially houses and farmland, they also revealed their willingness to re-allocate as they consider the project to be in the best interest of the country and their communities.

2.7. Bank Group experience, lessons reflected in project design

The experiences of the Bank's current projects and others recently concluded are reflected in the program design and are summarized below in the table:

I. Project		II. Weaknesses	III. Proposed changes in current project design
No.	**Project name**		
1.	Electricity V (Ongoing)	Over 2 year delay between loan signing and effectiveness	- Quality at entry has been improved by involving TZFO especially CPO to ensure that such delays are not repeated. In addition, the recruitment of an energy specialist at TZFO will ensure closer project monitoring and supervision. In addition, given that this is a multi-donor project, there will be added pressure on MEM/TANESCO to avoid such delays
		Delays in implementing procurement activities due to poor quality of TORs, evaluation reports etc.	- Detailed feasibility study carried out by a consulting team has all the TORs and bidding documents prepared - Procurement lots have been reduced to one transmission line per donor partner and so this will reduce the number of procurement processes - Presence of procurement officer at TZFO will ensure detailed and timely submission of procurement plan and provide some training to new procurement staff - Recruitment of energy specialist at TZFO in 2010 will ensure timely follow up of work plans - TANESCO will be strengthening the procurement department which coupled with recruitment of technical advisor from the current project should provide the necessary mentoring to procurement staff.
2	Electricity IV (PCR completed in 2007)	Closer coordination and synchronization by Bank of activities with those of other donors	- Project appraisal was carried out together with all the other donors (WB, JICA, EIB, Korea EDCF). This strong coordination will continue with joint supervision missions, joint consultants for supervision of works, etc.
		Delays during implementation would have been reduced had the Borrower been better appraised of Bank's procurement rules and regulations	- One of the tasks of the Procurement officer at TZFO is to organize trainings on Bank's procurement rules and regulations; in addition, ADB's procurement rules are now more in line with those of WB. Using standardized bidding documents of the WB will minimize any confusion of multiple rules and regulations.
		More rigorous examination of loan conditions and where necessary, provision of technical assistance	- Project will recruit procurement technical advisor for a limited period to provide hands-on training to procurement staff
		Baseline study on socio-economic profile of the project areas would have provided a bench mark for evaluating effectiveness of the project	- Socio-economist took part in the appraisal mission along with other donor partners; visits to potentially affected project sites were made and appropriate actions have been agreed upon

3	Monduli District Water Supply & Sanitation	Time from feasibility and detailed studies to project implementation	Feasibility study was finalized in early 2010 and soon thereafter the joint donor appraisal mission was fielded. Given that the feasibility study is for the entire line and all the donor partners are expected to have the project appraisal reports approved by their respective Boards by Oct 2010, the time lag between feasibility and implementation will be minimized.
		Timely disbursement of counterpart funds	Given the strong donor coordination and the importance and size of the project, there are strong reassurances that there will no delays in counterpart funds.

2.8. Key performance indicators

2.8.1 The main deliverables of the project are: (i) construction of 667 km of 400 kV double circuit transmission lines; (ii) extension of 4 substations at Iringa, Dodoma, Singida and Shinyanga; (iii) procurement of distribution materials; (iv) full implementation of the ESIA and RAP measures.

2.8.2 In addition, in strengthening the transmission capacity of the grid, the project will facilitate private investment in IPP plants in the south of the country. The 400 kV design is also a requirement to facilitate planned interconnector projects in the region by providing the critical link between the Eastern Africa Power Pool (EAPP) and the Southern Africa Power Pool (SAPP) linking Tanzania with Kenya in the North and Zambia in the South. Moreover, the proposed project will facilitate investment in the expansion of electricity distribution network to meet the government's objective of connecting 100,000 customers per year.

2.8.3 The project will (a) allow the transfer of 550 MW when operated at 220 kV level and 1,000 MW by 2020 when operated at 400 kV level; (b) improve and provide transmission capacity to North and Northwest Tanzania thus, increase revenues to TANESCO (approx. TSh 20 million /year in 2014); (c) reduce transmission losses between Iringa and Shinyanga from 5% in 2009 to about 2.4% by 2015 and (d) reduce the frequency of outages in the backbone interconnector to about 240 hrs/year[3].

2.8.4 During construction, several direct jobs will be created, including casual labour for construction that could be sourced directly from the project area as well as from contracts for services provision for security, bush clearing, digging, catering and waste disposal. Salaries, wages and fees to construction workers and local contractors will give additional boost to the local economy. Estimates from similar projects executed in other countries suggest that 7 – 10% of project costs could be spent in the project area.

2.8.5 Progress during implementation will be monitored by the Project implementation Unit who will 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 **Economic Performance:** For the economic analysis, taxes and similar transfers are not considered. Consistent with the method adopted in Tanzania's Power Sector Master Plan (PSMP), the economic analysis is done in constant prices and no inflation considered. Furthermore, a 10% economic discount rate is used to match the PSMP. The EIRR for the project is 35.6% whilst the ENPV is USD 2,122 million. In summary, the economic assessment finds that the proposed project is a viable economic option for supplying significant power to the north of Tanzania. The economic

[3] Since this is a new line, there is no baseline to compare the reduction in the frequency of outages. The target indicator represents the estimated unavailability of the new line once in operation.

rate of return for the project is significantly greater than its cost of capital. This result is also found to be robust as it holds under different sensitivity scenarios.

3.1.2 The economic value of the project is derived from lower cost power generation options in the south relative to significantly higher cost sources in the North of the country (likely to be diesel and HFO plants). The economic rate of return parameter of the project was tested against the risks identified as possible downsides during implementation or operation of the project. These risks are 20%+- changes (i) cost of loss compensation, (ii) variation in discount rate, (iii) variation of investment cost) (iv) variation of exchange rates and (v) variation in cost of transported power. The resilience of the economic benefits of the project was tested by running a number of sensitivity scenarios. In each case the ENPV and EIRR were computed and the results of the above sensitivity tests confirm that the return parameters of the project are robust under the most likely risks to which the project can be confronted.

3.1.3 **Financial Performance**: The results of the financial analysis as presented in Annex B.7 indicate that the proposed project is financially viable. The financial internal rate of return (FIRR) analysis was undertaken using constant prices. The main project costs are equipment, civil works, incremental O&M costs, technical consultancy (owner's engineer), resettlement, compensation and cost of environmental mitigation measures. The capital costs for calculating the FIRR include both physical and price contingencies. The economic life of the transmission line is 30 years. The base case result gives an FIRR of 19.6% and a FNPV of US$383.4 million.

3.1.4 In calculating the project revenues, an estimate of the transport tariff of 4.86 USc/kWh based on the difference between the retail tariff recommended in the Cost of Service Study (COSS) and the Long Run Marginal Cost (LRMC) of generation, is used. Annex B.7 contains detailed financial analysis

3.1.5 A sensitivity analysis was performed to test the robustness of the FIRR to changes in key parameters of the financial rate of return analysis. A 20% increase in O & M cost, slightly reduces the IRR to 19.5%.

Table 9: Base Case financial and economic returns and indicators

Item	**Base case returns and indicators**
FIRR, FNPV @12% real (Base case)	19.6%, USD 383.4 million
EIRR, ENPV @10% real (Base case)	35.6%, USD 2,122 million
Minimum DSCR (15 yrs) / Average DSCR (15 yrs)	3.64x / 8.75x

Table 10: Result of key sensitivities on FIRR

	-20%	**0%**	**20%**
Transport Tariff	17.0%	19.6%	22.0%
O & M Costs	19.7%	19.6%	19.5%

3.1.6 TANESCO's weak financial performance over the last several years can be attributed to a combination of high levels of network losses, low network voltages, low electricity tariffs and lack of investment.

3.1.7 The utility's operating costs (especially in generation) have markedly increased, primarily as the reliance on thermal energy has increased. Hydro generation had been continuously decreasing from 98 percent in 2002 to 40 percent in 2006 (severe drought was experienced in East Africa from 2004 to 2006), and now it is about 56 percent of the installed capacity. Over the last few years, IPPs have become a substantial contributor to thermal electricity generation for TANESCO. IPP contribution to the power sector is expected to increase from 4 percent in 2003 to about 56 percent in 2012.

3.1.8 As a result of the aforementioned issues, there have been constant revenue shortfalls to meet operating costs. Despite Government's continuous support, TANESCO has been incurring a net loss and has had no alternative but to resort to expensive short-term borrowing to cover its cash flow shortfalls.

3.1.9 TANESCO's financial health has started to improve from 2008. The 2008 financial statements show an increase of operating revenue by 27 percent compared to the previous Fiscal Year 2007. With the increased revenue, the utility has been able to improve from the net loss of TSh 67.2 billion in 2007 (with operating loss of TSh 63.2 billion) to the net loss of TSh 21.6 billion (with operating profit of TSh 2.7 billion) in 2008 and net loss of TSh 47.6 billion (with operating loss of TSh 3.2 billion) in 2009. The overall collection rates have remained high (at 95 percent on average), even though energy losses also remained high (24 percent) which underscores the urgency of transmission and distribution rehabilitation works to be implemented in the shortest possible time. The Bank's interventions through the Electricity IV and V projects together with other interventions from GoT and development partners active in the energy sector in Tanzania will improve the performance of the utility once the projects are completed. JICA's transmission rehabilitation project in Dar es Salaam is the most advanced expecting to be completed in October 2010.

3.2. Sustainability

3.2.1 Since 2004, Government has embarked on the implementation of a financial recovery programme for the power sector, which aims at placing TANESCO on a path to long-term sustainability. The strategy involves a progressive return to full-cost recovery tariffs as well as a significant reduction in network losses. With regards to the project, overall sustainability rests on TANESCO's capacity to operate and maintain the infrastructure as well as its ability to obtain approval for a tariff adjustment from the regulator, EWURA. GoT and TANESCO's commitment is evidenced by the ongoing utility reform measures including the recent appointment of a managing director and the filling of other key management positions; accelerated way project preparation documents were submitted by TANESCO to the DPs; and the hiring of a financial advisory firm for preparing the Cost of Service Study (COSS) and the tariff review study which were prerequisites for the multi-year tariff application submitted to EWURA.

3.3 Tariff Analysis

3.3.1 There is still a pan-territorial tariff regime in Tanzania and a uniform pan territorial tariff is charged throughout the country by TANESCO. The electricity-selling tariff is categorized in 5 major classes namely; Domestic low usage Tariff (DI), General usage Tariff (T1), Low Voltage Maximum Demand Tariff (T2), High Voltage Maximum Demand Tariff (T3) and Zanzibar Tarff (T5).

3.3.2 TANESCO's revenues are regulated by tariffs set by the EWURA, The facility's profitability and financial sustainability are therefore dependent on EWURA's approvals of future multi-year tariff application to cover the cost of operation and improvements in operational efficiency of the utility.

3.3.3 The most recent tariff increase approval (effective January 2008) of 21.7% which was granted by EWURA was an interim measure subject to completion of the COSS mentioned above. The COSS which was completed in May 2010 produced estimates of the long run cost of power supply, proposes a mechanism for indexing of tariffs, and suggests an application for geographically differentiated tariffs amongst others. This will ensure that price applied to consumers encourages the efficient use of electricity and that tariffs are maintained at a level

necessary to ensure financial sustainability of the power sector. The COSS is advocating for multiyear tariff structure with automatic adjustment for inflation, foreign exchange and fuel costs while ensuring that TANESCO ultimately attains full cost recovery tariffs. Based on the COSS, in May 2010, TANESCO submitted an application for rate adjustments to EWURA with a request for a 34.6% increase with subsequent increases of 13.8% in 2011 and 13.9% in 2012. EWURA will conduct an initial review of the application before rendering a decision.

3.4. Environmental and Social Impacts

3.4.1 *Environment*

3.4.1.1 The environmental classification of the project is Category 1 since the project will be transmitting high voltage power of 400 kV which is above the Bank threshold of 110 kV for category 2 , and will span over a distance of 670 km; the transmission lines will be crossing highly populated areas with an estimated aggregate population of over 3,600 (comprising 860 households); and in addition will affect 122 ha of farm land during construction and 35 ha during operation. The executive summary of the full Environmental and Social Impact Assessment and RAP annex were posted on the Bank's website on 5th April, 2010, distributed to the Public Information Centre (PIC) and Tanzania Field Office, and was also distributed to the Board.

3.4.1.2 The main negative impacts of the project are: relocation of populations and displacement of private or public economic and social structures; depletion of vegetation in the total land requirement of the corridors, and temporary disturbances during the construction phase. Details of the environmental impacts and the measures proposed are outlined in the afore-mentioned summaries.

3.4.1.3 The cost of the environmental and social measures for the entire project, including the environmental and social management plans as well as the resettlement and compensation plan is estimated at USD 18.2 million. The cost of implementation of the environmental and social management plan (ESMP) is included in the project investment cost. The cost of compensations is estimated based on the existing Resettlement Policy Framework (RPF) Report and may be subject to change upon receiving the final RPF or RAP. The cost of compensation will be borne by the Tanzanian government and securing of the required amount in an escrow account will be one of the conditions precedent to the first disbursement and all the lenders agreed that the compensation for PAP will be calculated based on full replacement cost rather than on market value. The Project Coordination Unit will ensure that persons affected by the project receive full compensation prior to works start-up.

3.4.2 Climate Change

3.4.2.1 Without this project, industrial and household consumers in the north of Tanzania would resolve to using electricity generated from thermal power plants. Therefore the line will be offsetting potential thermal generation in the north of the country and reducing potential for carbon emissions. Similarly as already mentioned, because the new 400 kV transmission line will significantly lower transmission losses when compared with conventional 220kV lines currently in operation in Tanzania, there will also be economic benefits in the form avoided CO2 emissions. For the line segment being financed by the bank (Dodoma – Singida), CO2 emissions reduction is estimated at about 26,047t-CO2 per annum starting 2016.

3.4.2.2 The removal of the vegetation will have some minor effects on local climate like rising of temperature and reduced air humidity. The energy transported will be mainly fed in from gas, hydro and wind power plants. This will allow for some substitution of the current thermal production,

which releases greenhouse gases into the atmosphere, with less polluting power generating assets. The project will also improve the energy security of the country

Gender

3.4.2.3 The project design and its implementation per se do not have negative impacts that affect one gender group more than the other. Having said that, the risk of contracting HIV/AIDS is higher among women and girls than for men. This is because most men who will work in campsites may not come with their families and are most likely going to lure girls and women into sexual relationships using cash as the incentive. The national average prevalence rates are higher among women at 6.8% compared to 4.7% for men. Although the project will endeavor to offer equal opportunities for employment during implementation, it is still true to say that women often get discriminated against when hiring labour partly due to the existing socio-cultural traditions and expectations, limited economic opportunities, and the dynamics that dictate gender relations in their communities. In this regard, the project shall endeavour to recruit at least 10% of the unskilled workforce, especially clearing of way leave and administrative work to women. Furthermore, a social survey has shown that most of the buildings in the area are built using mud, poles and thatch. In situations of resettlement, construction of such buildings tend to cause a disproportionate burden on women who will be expected to provide building materials such as water, mud and grass on top of the usual domestic chores that women are expected to perform.

3.4.2.4 On the other hand, the project has potential benefits that will accrue to both men and women. Through rural electrification, access to electricity will improve and allow households to use electricity for lighting. This will help women who are often responsible for ensuring that there is light in their homes to enable them prepare food for the families and put children to sleep. School going girls will have the opportunity of doing school work after they have completed assisting mothers with domestic chores. Mitigation measures have been incorporated into the project that will educate and sensitize the communities against the dangers of contracting HIV/AIDS and other Sexually Transmitted infections (STIs). With regard to house construction following resettlement, the project will abide by the policy of providing equal to or better houses which in most cases will enable households to construct replacement houses using conventional materials such as cement, burnt bricks and iron sheets for roofing. Sensitization and awareness programs will be undertaken through TANESCO to ensure that women participation during implementation and subcontracting is encouraged.

3.4.3 Social

3.4.3.1 The project is expected to impact on poverty as a result of the potential economic growth stimulated by the supply of reliable power supply. The vast majority of people in Tanzania do not have access to electricity and it is estimated that only 10% of the population, mainly in urban areas, is connected to the national grid. The project is intended to supply electricity to as many as 8,200 villages in north and north western Tanzania. Employment opportunities especially in unskilled labor will be created both during construction and operation related to maintenance of way-leave. There will be direct employment created during construction where it is estimated that at least 1500 people will get jobs overall and approximately 500 will be employed in the section to be funded by AfDB. Of these 20% are expected to come from the local area. The net monthly income is estimated at TSh 150.000 (USD115) and assuming that about 50% hereof will be spent locally, and taken into account the regional annual household income level TSh900000, the income level in the project area as a whole will be raised by 1% for the two years of construction which translates into USD1.38 million.

3.4.3.2 Apart from direct part time employment, the project will bring temporary income generation opportunities through small scale commercial and services ventures e.g. sale of food products and

catering, rendering domestic services such as cleaning and guarding, etc. TANESCO will enter into an agreement with local communities for clearing the way-leave as has been done in the past. Construction related impacts such as; the combination of single men earning money and local girls struggling to sustain themselves is likely to lead to increased incidence of HIV/AIDS & STI. Although much of the project area has a relatively low infection rate, Iringa on the other hand has the highest rate in Tanzania of 13.7%, the project has incorporated an HIV/AIDS mitigation activities which shall include sensitization and peer educator programs at 6 main areas likely to host most of the construction workers. In most cases the transmission line will run near the principle main road Iringa- Dodoma-Singida-Shinyanga (T5/T3), whose record of traffic accidents is poor and has remarkable traffic volume of heavy trucks. The additional traffic induced by construction works may increase risk of traffic accidents. In addition, there will be occupational health and safety risks as a result of the nature of the project. In all the risks outlined, adequate measures of mitigation have been proposed and will be implemented within the project.

3.5 Involuntary Resettlement

The project will potentially affect populations living within the way leave who may lose dwelling houses and associated buildings, public infrastructure (schools, clinics, churches, mosques), graves, bare and cultivable land, crops, trees and income sources, among others. 860 people are estimated to be directly affected by the entire line stretch from Iringa to Shinyanga, (216 for the Dodoma – Singida section to be financed by AfDB/JICA). A Resettlement Policy Framework has been prepared and is the basis for the resettlement and compensation estimates. A full RAP is in process of being prepared and will be finalized prior to project implementation. Completion of RAP exercise and evidence of full compensation and resettlement in accordance with the Bank's Policies and guidelines will be a condition of the loan. Based on the available projections, the total cost of the RAP for the full stretch of the line is estimated to be EUR 6.6 million, and that of the AfDB section estimated at EUR1.7 million. The ESIA and RAP (Framework) have both been received by the Bank and the ESIA Summary was posted on the Bank's website on 5th April, 2010.

IV – IMPLEMENTATION

4.1. Implementation Arrangements

4.1.1 Executing Agency: TANESCO is the Executing Agency and Beneficiary of the proposed loan. They will be required to produce annual procurement and disbursement plans that would form the basis for monitoring and planning cash flow needs.

4.1.2 The implementation team will comprise a Project Coordinator reporting directly to TANESCO's General Manager, Transmission. The Project Coordinator will be assisted by three (3) transmissions engineers and one (1) substation engineer responsible for each lot of the project and one procurement specialist. In addition, a project accountant dedicated to the project, an Environmental Group including one environmental specialist for each line segment, and two social specialists will also assist the Project Manager. The HIV/AIDS awareness program will be sub-contracted to a specialized service provider under the Contractor. Additional supervisors and counterpart staff to the project consultant will also be assigned by TANESCO as necessary. Furthermore, appropriate staff from TANESCO's financial department will be designated to work exclusively on the Project. The qualifications and experience of the members of the implementation team need to be acceptable to the Bank, and is a condition for first disbursement of the ADF loan. The Terms of reference for the project manager is shown in Appendix V.

4.1.3 Procurement Arrangements for Works: Works relating to construction of transmission lines will be procured on a supply and installation basis through Prequalification Process. To ensure a cost-effective implementation of the project and to identify the least cost combination of bids with possible cross discounts, it was agreed among the donors to use one prequalification document acceptable to TANESCO. Accordingly, The World Bank Standard Prequalification Document for Procurement of Works August 2006 revised May 2007 shall be used for the sections of the line financed by the WB, EIB and ADB/JICA.

4.1.4 The transmission line construction includes a total of 667 km. and will have three lots: Lot 1 includes construction of 225 km of 400 kV line between Iringa and Dodoma, lot 2 construction of 217 km of 400 kV line between Dodoma and Singida and lot 3 includes 225 km of 400 kV line between Singida and Shinyanga. The section for Lot 2 between Dodoma and Singida will be financed by the African Development Fund (ADF) and Japan International Cooperation Agency (JICA). For the other two sections, the European Investment Bank (EIB) will finance lot 1 and the World Bank lot 3.

4.1.5 The World Bank Standard Bidding Document for Procurement of Plant Design, Supply, and Installation April 2008 shall be used for all sections of the line financed by the WB, EIB and ADB/JICA. One bidding document shall be used with three schedules of prices for each section of the line. However, any specific requirement by a financer shall be indicated in the respective bid data sheet. One (the same) evaluation report will be produced and submitted to corresponding financing agencies. When agreement is reached among the financers on the evaluation report each financer will give no objection to the executing agency. Contract will be awarded at the same time for all sections of the line to facilitate the implementation of the project in a coordinated manner and in parallel

4.1.6 Procurement of Distribution Materials: The distribution material will be procured through International Competitive Bidding using ADB's standard bidding document for supply of Goods.

4.1.7 Procurement Arrangements for Services: TANESCO has already employed a consultant for preparation and evaluation of the prequalification, bidding document, evaluation of bids and assistance during contract negotiation. The consultant for project supervision and management would be procured through Short-List as per the selection procedure of the World Bank. The World Bank will finance the total cost of the consultancy services for the whole project. The Terms of reference for the consultant will be reviewed and agreed by all five financers.

4.1.8 Review Procedures: The following documents are subject to review and approval by the Bank before promulgation:

a) General Procurement notice
b) Specific Procurement Notice;
c) Prequalification document
d) Bidding document for procurement of distribution material
e) Prequalification evaluation report
f) Tender Documents for transmission line construction
g) Tender Evaluation Reports including recommendations for Contract Award
h) Draft Contracts

4.1.9 Disbursement Arrangements: The disbursement of the ADF loan will be through the direct payment method. However, if necessary and following Bank approval, other methods of disbursement of the Bank could be used.

4.1.10 Audit Arrangements: The internal control system at TANESCO is satisfactory. Bank reconciliations are prepared on a monthly basis and reviewed by the appropriate layers of management; for projects, a specific fixed asset register is maintained for each project to monitor project assets. Furthermore, there is a commitment monitoring system that is used to ensure that contractors are paid on time. The project accounts and financial statements will be audited annually, in accordance with internationally acceptable accounting standards, by an External Auditor appointed by the Comptroller and Auditor General of Tanzania and acceptable to the Bank. The audited accounts and financial statements of the project and of TANESCO shall be submitted to the Bank within six months from the close of the financial year. The External Auditor for auditing the project accounts will be recruited through Short-List of local firms following the selection procedure based on Lowest Price for Comparable services. The services of the Auditor will be paid out of the ADF loan

4.1.11 Monitoring and Evaluation: As mentioned, TANESCO will assume primary responsibility for monitoring project implementation and fulfilling the Borrowers' reporting obligations to the Fund. Quarterly Progress Reports (QPRs) will be submitted to the Fund by TANESCO. These reports shall cover all aspects of project implementation, including the status of progress against agreed implementation and disbursement schedules for all components; implementation of environmental and social mitigation measures. The QPRs shall also highlight issues affecting project implementation and proper corrective actions. Through the joint JICA /AfDB supervision missions and reviews of annual audit reports, the Fund will closely monitor the project implementation.

4.1.12 Mid-Term Review (MTR): A joint JICA /AfDB mid-term review of the project will be held not later than 22 months after the commencement of implementation activities, which shall inform any adjustments to the project design to ensure that project objectives are achieved. After the commissioning of installations, the EA will prepare and submit a Project Completion Report (PCR), which would serve as input in the preparation of the Bank's own PCR.

4.1.13 Implementation Schedule and Supervision: The project will be implemented over a period of 39 months. On the assumption that the ADF loan is approved in October 2010, the project is scheduled for completion by December 2013, with the commissioning of all sections of transmission lines and substations. The critical milestones for project implementation are given below

Table 11Project Implementation milestones

No.	Activity	Responsible Agency	Target Date
1	Loan Approval	ADF	October 2010
2	General Procurement Notice	ADF/TANESCO	December 2010
3	Loan Signed	ADF/TANESCO	January 2011
4	Effectiveness	TANESCO	April, 2011
5	Recruitment of the Project Supervision and Management Consultant	TANESCO	March 2011
6	Bid document submitted to the Bank	TANESCO	Nov. 2011
7	Review of bidding document and no objection	ADB	Nov.2011
8	Bidding	TANESCO	Jan-March, 2011
9	Evaluation, no objection,	TANESCO/ADB	March-May 2011
10	Contract Signature for construction of the line and Mobilization	TANESCO	June-August, 2011
11	Procurement of Distribution Materials	TANESCO	January 2012 – June 2013
12	Commissioning	Contractors	July 2013
13	Project Completion Report	TANESCO/Consultant	March 2014

4.1.14 All contractors for the three sections of the line and substations will be mobilized at site in August 2011. Before commencement of the construction work TANESCO will implement the environmental mitigation measures as per the recommendation of ESIA report. The manufacturing supply and installation of all sections of the line and the substation will be undertaken in parallel and completed within 30 months from contract commencement. The testing of the transmission lines and substations is planned to take place in October – November 2013, and the project will be commissioned by December 2013.

4.2. Monitoring

4.2.1 The Project will be implemented over a period of 39 months from loan approval. The critical dates for the implementation of the project are given in Annex B. table B.9

4.2.2 The Project will be launched in the fist quarter of 2011and will be monitored through field mission from headquarters at least once a year from 2011 through to 2014. The Bank supervision will also involve desk supervisions including review of bi-annual progress and annual audit reports. The Bank's Tanzania Field Office (TZFO) will also carry out field supervisions once a year or on a need basis. The coordination of the missions will be done by the Ministry of Finance and Economic Development in collaboration and the Ministry of Energy in collaboration with the Executing Agency. The field missions will be undertaken in accordance with the tentative schedule presented in Annex B. table B9.

4.2.3 Project Implementation Unit assisted by the consultant has the primary responsibility for monitoring project implementation and fulfilling TANESCO's reporting obligations to the Fund, including preparation and submission of Quarterly Progress Reports (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. Moreover, TANESCO shall maintain separate accounts that permit the identification of expenditures by category and financing source for all components of the project

4.2.4 The supervision consultants shall be required to prepare and submit to TANESCO and the Fund, final commissioning reports at the completion of their assignments. After the commissioning of the project, the EA will prepare and submit a Project Completion Report (PCR) which will also include a section on training. This will serve as input in the preparation of the Bank's own PCR.

4.2.5 During implementation, TANESCO's Environmental Monitoring Unit (EMU) assisted by the consultant will monitor the implementation of the ESMP and will prepare and submit to the Bank quarterly environmental reports. The Unit has been handling such tasks and is fully conversant with Bank procedures. The Tanzanian Environmental Protection Agency will also be actively involved during the monitoring phase.

4.3. Governance

4.3.1 TANESCO is managed by a Board of Directors consisting of members from various Ministries and Government organizations. The Board holds quarterly meetings and provides strategic direction to the Company's operations; reviews performance of the Corporation, including the implementation of the Capital and operational budgets; and approves the consolidated financial statements.

4.3.2 TANESCO is committed to good corporate governance. The Board of Directors closely works with the Management Committee of TANESCO with regard to the overall activities of the Corporation. The internal controls of TANESCO are satisfactory as adequate safeguards are built into the financial management system to monitor the utilization of its resources. Furthermore,

TANESCO's financial statements are audited annually by a private audit firm, which carries out annual audits. At the project level, the implementation team will be required to maintain accounting and financial records that will be audited in accordance with international accounting standards.

4.4. Risk Management

Implementation of the Iringa-Shinyanga transmission line is not a complex undertaking especially as the proposed routing uses an existing right of way (220kV single circuit transmission line currently supplies about 200 MW of power from Iringa to Shinyanga). Identified project risks and mitigation measures are summarized in the following matrix.

Risk	Risk Mitigation Measures
Lack of generation capacity or slower than projected demand growth could result in under-utilization of the proposed transmission line.	According to the PSMP, an additional 871MW will be required over the next 5 years to secure an energy reserve margin of 15%. TANESCO in collaboration with development partners are committed to supporting the next least cost generating options (hydropower and gas infrastructure) to assure continuity of supply. Through this proposed Project and the current Electricity IV and V initiatives, the Bank has allocated key resources to support TANESCO/GoT in advancing prospective private sector generation projects. In the event that generation capacity is not developed according to PSMP, the sensitivities on the FIRR and EIRR, with respect to 20% reduction in base case load projections, remain robust.
TANESCO staff lack technical expertise to operate and maintain the new 400 kV transmission line.	Both the EPC and consultancy contract for the construction of the transmission line will include specific provisions to ensure the training of TANESCO engineers. Technical assistance activities included in the project will support TANESCO in the areas of Project Supervision and Management. In addition, Norway is financing technical support (strengthening of EAC, East African Power Pool, TANESCO, TaTEDO, gender & energy) in collaboration with its grid operator, Stattnet. This gives additional comfort that TANESCO will develop the capacity to operate and maintain project facilities.
The regulator (EWURA) may not approve a tariff increase which could jeopardise TANESCO's financial recovery plan	EWURA approved an interim tariff adjustment of 21.7% effective January 1, 2008. EWURA passed an Order that TANESCO must complete a comprehensive Cost of Service Study (COSS) and tariff review study for subsequent tariff adjustments to be accepted. The COS is now complete and on 28th May, 2010, TANESCO submitted a new multi-year tariff application that will allow for better cost recovery and a full cost recovery trajectory.
Weak institutional and implementation capacity in TANESCO	TANESCO's project implementation team will comprise a Project Coordinator reporting directly to TANESCO's General Manager, Transmission. During appraisal recommendations were made for key personal including accountants and environmental personnel to work specifically on the project. In addition, the Bank will recruit external auditors for auditing all the Project accounts for all project components.
Lack of proper DP coordination	Given the size of the DP group, DP's conducted joint appraisal of the project and have agreed on financing plan, technical solution, and coordination of various actions during the procurement and implementation phase. The 1st post-appraisal donor workshop was organised in Stuttgart, Germany on 7th June to facilitate a uniform/streamlined procurement strategy and avoid potential delays
Cost-overrun	In addition to the physical (10%) and price (F/C 4%, L/C 5%) contingencies built into the project costs, the contract packaging will ensure that all necessary construction guarantees and insurances will be in place. Furthermore, liquidated damages will serve to act as an incentive against completion delays. Joint supervision of the project will be conducted at least once a year by all the financing partners.

4.5. Knowledge building

4.5.1 The proposed project is one of the longest transmission line projects to be undertaken on the continent in recent times. The project provides capacity building opportunities to the staff of TANESCO specifically in the area of design, management and operation of the project assets. Therefore, during the construction of the lines and substation TANESCO's staff will be trained on the job by the contractors and the consultant.

4.5.2 The ESIA and the ESMP for the project conducted by TANESCO conform to international best practice Environment standards. Implementation of the ESMP including the monitoring system will allow TANESCO to promote best international practice in construction and operation of

transmission lines of this voltage. TANESCO's knowledge building resulting from the Bank's intervention will help GoT to attract more investment in the power sector. In turn, the Bank will also learn from the lessons learned from its planned supervision on how best to assist the implementation of such projects.

V – LEGAL INSTRUMENTS AND AUTHORITY

5.1. Legal instrument

The legal instrument used for the project is a loan which will be given to the Government of the United Republic of Tanzania and the proceeds of the loan on-lent to TANESCO on the same terms as granted to the Government by the Bank.

5.2. Conditions associated with Bank's intervention

5.2.1 Conditions Precedent to Entry into Force: The entry into force of the Loan Agreement shall be subject to the fulfilment by the Borrower of the provisions of Section 12.01 of the General Conditions Applicable to Loans and Guarantee Agreements of the ADF.

5.2.2 Conditions Precedent to First Disbursement of the Loan: The first disbursement of the loan shall be subject to Borrower having submitted to the Bank or fulfilled:

i. It has concluded a Subsidiary Loan Agreement with TANESCO for on-lending the loan of the Fund, on same terms and conditions as granted by the Bank to the Government.

ii. Written confirmation that joint financing for the project with JICA has been secured.

iii. Borrower has submitted a full RAP acceptable to the Fund by 28th February 2011

iv. All relevant Project Affected Persons (PAPs) have been fully and adequately compensated prior to hand-over of site to contractor

v. A Project Coordinator, supported by a minimum of one procurement specialist, an accountant and five Engineers (three electrical transmission engineers for each lot of transmission line, one electrical substation engineer for the substation, one civil engineer) whose qualification and experience are acceptable to the Fund.

vi. Confirmation from a Financial Institution acceptable to ADF of the deposit into an escrow account of the amounts for the resettlement and compensation, as set out in the Environment and Social Management Plan (ESMP) of the Project.

vii. TANESCO's Operating guidelines which outline implementation arrangement, disbursement, financial management, and procurement must be acceptable to the Bank.

viii. Opening of a Bank Account in the Bank of Tanzania to receive project funds for audit consultancy costs.

5.2.3 Additional condition for subsequent disbursements: Subsequent disbursement of the loan shall be subject to Borrower having fulfilled the following:

i. Having compensated and relocated/resettled, in accordance with the RAP, any PAPs prior to the continuation of construction in subsequent sections of the transmission line.

ii. Borrower undertaking: "To implement the Environmental and Social Management Plan".

5.3. Compliance with Bank policies

5.3.1 This project complies with all applicable Bank policies.

VI – RECOMMENDATION

6.1 Management recommends that the Board of Directors approve the proposed ADF loan of UA 45.36 million to the Government of Tanzania for the purposes and subject to the conditions stipulated in this report and the Loan Agreement.

Appendix I: Comparative Socio-Economic Indicator

Tanzania - Development Indicators				
Social Indicators	**Tanzania**		**Africa**	**Developing countries**
	1990	**2008 ***		
Area ('000 Km²)	945		30,323	80,976
Total Population (millions)	25.5	41.5	985.7	5,523.4
Population growth (annual %)	3.2	2.5	2.3	1.4
Life expectancy at birth, total (years)	51	53	55	66
Mortality rate, infant (per 1,000 live births)	100.3	70.9	83.9	53.1
Physicians per 100,000 People	...	4.8	39.6	78.0
Births attended by skilled health staff (% of total)	52.0	43.4	51.2	59.0
Immunization, measles (% of children ages 12-23 months)	80.0	90.0	83.1	81.0
School enrollment, primary (% gross)	69.7	111.9	99.6	106.0
Ratio of girls to boys in primary education (%)	98	98	92	100.0
Illiteracy rate, adult total (% of people ages 15 and above)	...	27.7	33.2	26.6
Access to Safe Water (% of Population)	49.0	55.0	64.3	84.0
Access to Sanitation (% of Population)	35.0	33.0	37.6	53.0
Human Develop. (HDI) Rank (Over 179 Countries)	...	152	...	...
Human Poverty Index (% of Population)	...	32.9	38.7	...

	Tanzania			
Economy	**2000**	**2007**	**2008**	**2009****
GNI per capita, Atlas method (current US$)	270	400	...	...
GDP (current Million US$)	10,186	16,825	18,346	19,729
GDP growth (annual %)	4.9	7.1	6.8	6.1
Per capita GDP growth (annual %)	2.4	4.5	4.3	3.6
Gross Domestic Investment (% of GDP)	16.8	29.6	32.4	30.3
Inflation (annual %)	6.0	7.0	10.3	9.1
Budget surplus/deficit (% of GDP)	-1.4	-4.0	0.0	-2.1
Trade, External Debt & Financial Flows	**2000**	**2007**	**2008**	**2009****
Export Growth, volume (%)	27.5	-6.6	6.9	13.1
Import Growth, volume (%)	-3.0	19.1	12.6	17.2
Terms of Trade (% change from previous year)	-3.8	17.7	-10.9	18.3
Trade Balance (mn US$)	-704	-2,634	-3,530	-2,785
Trade balance (% of GDP)	-6.9	-15.7	-19.2	-14.1
Current Account (mn US$)	-470	-1,839	-2,713	-1,912
Current Account (% of GDP)	-4.6	-10.9	-14.8	-9.7
Debt Service (% of Exports)	23.0	132.1	1.1	1.3
External Debt (% of GDP)	70.2	39.7	37.3	35.5
Net Total Inflows (mn US$)	1,199.8	2,343.3	...	...
Net Total Official Development Assistance (mn US$)	1,034.8	2,810.8	...	...
Foreign Direct Investment Inflows (mn US$)	216.0	599.5	...	...
External reserves (in month of imports of goods & services)	5.7	5.0	4.0	...
Private Sector Development & Infrastructure	**2000**	**2006**	**2007**	**2008**
Time required to start a business (days)	...	30	29	29
Investor Protection Index (0-10)	...	5	5	5
Main Telephone Lines (per 1000 people)	5	4	4	...
Mobile Cellular Subscribers (per 1000 people)	3	146	206	...
Internet users (000)	40.0	390.0	400.0	...
Roads, paved (% of total roads)	...	...	...	...
Railways, goods transported (million ton-km)	1,210	...	...	...

Source: ADB Statistics Department, based on various national and international sources

* Most recent year

Last Update: March 2009

** Forecast

Appendix II: Table of ADF Portfolio in Tanzania

Project (UA million)	Date Approved	Loan/Grant Amount (UA million)	Amount Disbursed(UA million)	% Disbursed
Agricultural Marketing Systems Dev. Programme	18/09/2002	Loan: 15.90 Grant: 1.00 Total: 16.90	12.30 4.22	15.68 0.99
District Agricultural Sector Investment Project	24/11/2004	Loan: 36.00 Grant: 7.00 Total: 43.00	12.30 4.22	34.16 60.28
Agricultural Sector Dev. Programme-Phase I	05/09/2007	Loan: 40.00	21.08	52.69
Roads Rehabilitation and Upgrading Project*	03/09/2001	Loan: 38.65	15.57	40.28
Zanzibar Roads Upgrading Project	9/06/2004	Loan: 16.22 Grant: 0.71 Total: 16.93	7.41 0.25	45.69 35.59
Singida-Babati-Minjingu Road Upgrading Project	17/11/2007	Loan: 60.00	4.08	6.80
Dar-es-Salaam Water and Sanitation Programme	17/12/2001	Loan: 36.94 Grant: 1.31 Total: 38.25	22.47 1.17	60.83 89.16
Rural Water Supply and Sanitation Programme	13/09/2006	Loan: 45.00 Grant:10.00 Total: 55.00	26.69 10.00	59.31 100
Moduli Rural Water Supply and Sanitation	27/11/2003	Grant: 15.51	11.93	76.89
Electricity V Project	14/12/2007	Loan: 28.68 Grant: 1.32 Total: 30.00		
Zanzibar Water Supply and Sanitation Project	11/11/2008	Loan: 25.00		
SAP for Vocational Ed & Training	09/07/2003	Loan: 14.22 Grant: 1.60 Total: 15.82	6.82 0.50	47.97 31.33
Support for Maternal Mortality Reduction Project	11/10/2006	Loan: 40.00	4.59	11.46
Support to Secondary Education Dev. Plan	05/09/2007	Loan: 20.00	9.75	48.77
Institutional Support for Good Governance	13/12/2004	Grant: 4.80	2.61	54.40
Poverty Reduction Support Loan	29/10/2008	Loan:100.00	100	100

Multinational projects

Arusha-Namanga Road Project	18/12/2006	Loan: 49.24 Grant: 3.50 Total: 52.29	10.72 -	21.76 -
East Africa Transport and Trade Facilitation	29/11/2006	Grant: 9.20	0.29	0.03
Isaka-Kigali Railway Feasibility Study	20/10/2004	Grant: 9.20	-	-
L Tgyika Int. Support.	09/12/2004	Grant: 4.96	0.18	3.62
Equity Investment in Access Bank of Tanzania	18/12/2006	Loan: 0.60	-	-

* Government has in principle indicated to restructure the loan balance

Appendix III: Projects financed by the Bank and other development partners

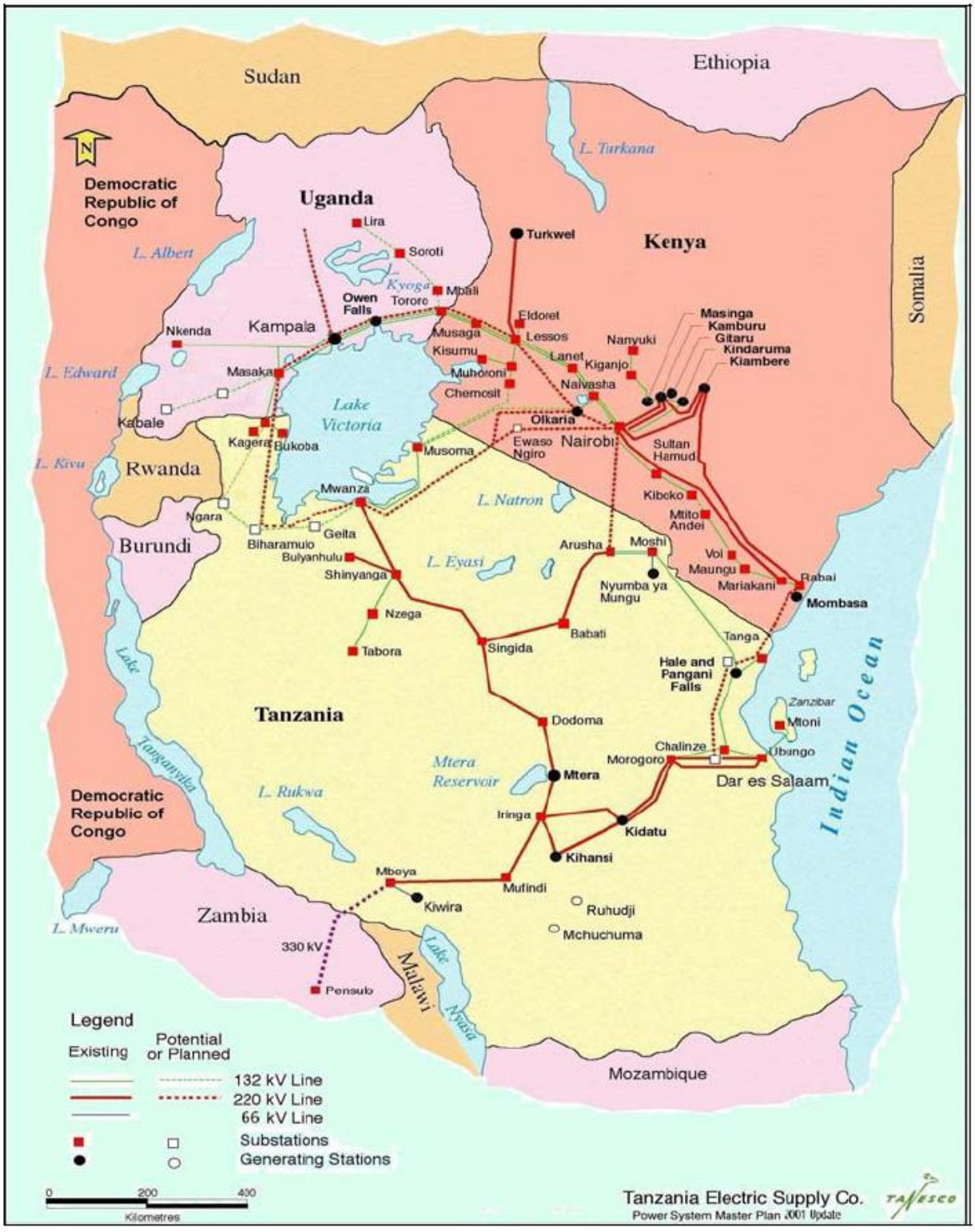
	PROJECT	FUNDING ENTITY & KEY CONTACT	ESTIMATED BUDGET
1.	Rural Electrification - Small Hydro power plants	**Norway/** Marianne Damhaug	
2.	Feasibility study Masigira HPP	**Norway/** Marianne Damhaug	Approx. USD 2 mill
3.	Strengthening of EAC – Energy Secretariat, Arusha (Regional)	**Norway/** Marianne Damhaug	Approx USD 1.7 mill
4.	Interconnection Kenya – Tanzania (Regional)	**Norway/** Marianne Damhaug	USD 3.4 mill
5.	Support to establishment of Eastern Africa Power Pool in Addis Ababa (Regional)	**Norway/** Marianne Damhaug	USD 2.2 mill
6.	Gender & Energy	**Norway/** Marianne Damhaug	USD 1.5 mill
7.	Support for the development of institutional framework for sustainable Biofuels production	**Sweden/Sida** Omar Mzee - Göran Haag **Norway/** Inger Anette S. Dahlen	SEK – 12 mill. NOK – 11 mill USD total 3,5 (appr.).
8.	Support to TaTEDO (Tanzania Traditional Energy Development and Environment Organization)	**Norway/** Inger Anette S. Dahlen	NOK – 10 mill USD 1,7 mill (appr.).
9.	Pemba Submarine Cable	**Norway/** Ørnulf Strøm	NOK 300 mill GoZ/GoT NOK 100 mill USD ~70 mill
10.	Support to TANESCO	**Norway** Ørnulf Strøm	NOK 22-37 mill USD 3,5–6 mill
11.	Support to TANESCO	**Norway** Ørnulf Strøm	No detailed funding requirements identified. To be identified and detailed in the process.
12.	Zanzibar	**Norway** Ørnulf Strøm	45 mill NOK USD 7,5 mill
13.	Zanzibar	**Norway with co-financing from DFID and Sida** Ørnulf Strøm	11,5 mill USD (DFID 3 mill, Sida 4,5 mill & Norway 4 mill)
14.	Makambako-Songea Transmission Line and Electrification of districts in Ruvuma and Iringa regions Feasibility Study	**Sweden/Sida** Göran Haag	Ca USD 70 million
15.	Power Supply to Ukerewe Principal Centres and Simanjiro District.	**Sweden/Sida** Göran Haag	~ $USD 7.8M (6.9 for construction, and 0.9 for engineering)
16.	Rehabilitation of Hale Hydropower Plant Feasibility Study	**Sweden/Sida** Göran Haag	USD20M for consultancy and construction
17.	Ruhudji Hydropower Plant	**Sweden/Sida** Stephen Mwakifwamba	USD1.3M Consultancy
18.	Rural Energy Fund (REF) Support	**Sweden/Sida** Stephen Mwakifwamba	USD 28.5 M

	PROJECT	FUNDING ENTITY & KEY CONTACT	ESTIMATED BUDGET
19.	Capacity Development of Rural Energy Agency	**Sweden/Sida** Anne-Lie Engvall Stephen Mwakifwamba	~ $USD1,5M for consultancies
20.	Rural Solar PV Market Facilitation Programme	**Sweden/Sida** Stephen Mwakifwamba	~ $USD 3.8M for consultancies
21.	Zanzibar Energy Sector Support	**Sweden/Sida** Goran Haag	~ $USD 3.8M for consultancies and equipment
22.	Sida/WB TF REA/EWURA support	**Sweden/Sida** Anne-Lie Engvall	~ $USD 3.5M
23.	Tegeta 45MW Gas Fired Plant	**50% Netherlands (ORET)**	US$ 38 million
24.	New Oyster Bay Substation	**JICA** Minako Yamamoto	US$24 million
25.	Capacity Development for TANESCO's efficient transmission and distribution systems	**JICA** Minako Yamamoto	Approx. US$5million
26.	Rehabilitation of Substation and Transmission line in Kilimanjaro	**JICA** Minako Yamamoto	Est. US$25 million
27.	Reinforcement of Power Distribution in Zanzibar Island	**JICA** Minako Yamamoto	Est. US$20 million
28.	Kilimanjaro-Arusha Transmission Line Project	**Korea EDCF** Hyekyung Lee	USD25Mil
29.	Kigoma Distribution and other Energy Solutions	**MCC** Matthew Kavanagh Karl Fickenscher	TBD
30.	Distribution Systems Rehabilitation and Extension	**MCC** Matthew Kavanagh Karl Fickenscher	Approx. US$65 million
31.	Zanzibar Submarine Interconnector	**MCC** Matthew Kavanagh Karl Fickenscher	Aprox. US$47 million
32.	Songo Songo Project: IPTL Conversion to Gas	**World Bank through IDA** Robert Schlotterer	US$20 million
33.	TEDAP Project: -	**World Bank through IDA**	US$85 million
34.	TEDAP: - Demand Side Management Study	**World Bank through IDA** Robert Schlotterer	Included as a component of the T&D project
35.	Songo Songo: Refinancing of 75% of Songas' equity for the Ubungo Expansion Project (Units 5&6)	**World Bank through IDA** Robert Schlotterer	US$ 42 million
36.	Songo Songo: Way-leave Village Electrification Scheme (WVES) and Resettlement Infrastructure Development Scheme (RIDS)	**World Bank through IDA** Robert Schlotterer	Included as a component of the Songo Songo Gas Development and Power Generation Project
37.	ERT/TEDAP preparation	**World Bank Trust Fund financed by Sida** Robert Schlotterer	~ $USD 2.1 M for consultancies
38.	TEDAP: Ruhudji Hydropower Project Development Legal, Financial and Technical	**World Bank through IDA** Robert Schlotterer	~ $USD 2M for consultancies

	PROJECT	FUNDING ENTITY & KEY CONTACT	ESTIMATED BUDGET
	advisors		
39.	Iringa-Shinyanga power transmission project (2010)	**World Bank, JICA Korea EDCF, EIB AfDB, Sida, Norad**	~US$ 467 million
40.	Electricity V	**African Development Bank** Prajesh Bhakta	$45 million
41.	BEST RAY (implementing partner OIKOS East Africa)	**EU** Baptiste Bobillier	EUR 1.5 M
42.	Upscaling access to integrated modern energy services (implementing partners: Hivos / Tatedo)	**EU** Baptiste Bobillier	EUR 2.3 M
43.	Mwenga 3MW Hydro Power Project	**EU** Baptiste Bobillier	EUR 3.6 M
44.	10th EDF Rural Energy Programme	**EU** Baptiste Bobillier	EUR 8 Million
45.	Improving the Electric Power Supply Reliability in the City of Dar es Salaam	**Finland** Iina Soiri, iina.soiri@formin.fi / tomi.sarkioja@formin.fi	25 MEUR (2009-2014)
46.	Joint Programme on Environment	**UNDP** Savinus Kessy	US$ 0.5 M
47.	Transformation of Rural Photovoltaic Market in Tanzania	**UNDP** Savinus Kessy	US$ 2.5
48.	Renewable Energy Sub-Sector Review	**UNDP/MEM** Bariki Kaale	US$ 0.5 M

Appendix IV: Map of the Project Area

Appendix V: Regional Interconnections



Language: English
Original: English

AFRICAN DEVELOPMENT FUND

PROJECT: IRINGA-SHINYANGA TRANSMISSION LINE PROJECT
COUNTRY: TANZANIA

TECHNICAL ANNEXES

Date: 30 MAY 2010

Appraisal Team	Team Leader	V. ZONGO	Chief Financial Analyst	ONEC.1	3352
	Team Members	D. LEKOETJE	Senior Public Utilities Economist	ONEC.2	2651
		N. KULEMEKA	Principal Socio-Economist	OICT.2	2336
		E. NEGASH	Chief Power Engineer	ONEC.2	3931
		S. ASFAW	Energy Specialist	ETFO	6717
		O. OKOYE	Senior Financial Analyst	ONEC.2	3816
		E. ZELEKE	Environmental specialist	ONEC.3	3993
		G. KAIJAGE	Financial Management Officer	TZFO	6506
		P. CHARLE	Macroeconomist	TZFO	6519
		Y. BALOZI HIJA	Procurement Officer	TZFO	6530
	Sector Manager	E.NZABANITA , OIC		ONEC.2	2125
	Sector Director	H. CHEIKHROUHOU		ONEC.0	2034
	Regional Director	D. GAYE		OREA	2040

Peer Reviewers	O. FALL	ONEC.1	3820
	J.P MUTSINZI	ONEC.1	2300
	L. EPIE	ORPF.2	2346
	E. MUGUTI	ONEC.1	3267
	F. KANONDA	ONEC.2	2723
	Y. ARFAOUI	OPSM.3	2308

TECHNICAL ANNEXES

TANZANIA

IRINGA - SHINYANGA TRANSMIOSSION LINE PROJECT

A. Country's Development Agenda, Sector Brief and donor's Support

A.1. On the basis of observed GDP figures, Tanzania's economy achieved an annual growth rate of approximately 7.1% in 2007 when expressed at constant 2001 prices. GDP growth (2001-2007) averaged 7.2% per annum and was projected to be 7.5% for 2008 and to slowdown to 6.5% in 2009. The 2007 growth rate is higher compared to 6.7% achieved in 2006 and higher than the long-run average annual GDP growth rate of 6.3% observed over the period from 1998 to 2007. The total GDP in 2007 at current prices is TSh 20,948,403 million or approximately US $439.5 per capita.

A.2. On sector by sector, agriculture grew by 4% in 2007 compared to 3.8% in 2006. Amongst others, the growth rate was driven by favourable weather conditions in most part of the country and continued implementation of the Agriculture Sector Development Program. The industrial sector grew by 9.5% in 2007 from 8.5% attained in 2006. This growth is due to the increase in manufacturing, electricity, gas and construction activities. The service sector grew by 8.1 % in 2007 from 7.8% in 2006. This increase is attributed to improvement in service provision in the trade repairs, transport, communication, public administration, education and health sub sectors.

A.3. Overall macroeconomic performance in the period (2001-2007) was quite impressive, underpinned by steadfast implementation of policy and structural reforms. The high performance recorded in 2007 is attributed partly to the good weather condition and improved performance in manufacturing, trade, industry, agriculture and service activities. Tanzania's long-term growth potential is high, as the country begins to Capitalise on its available resources and expands from a comparatively small market base. The availability of reliable infrastructure services will be the key determinant of the rate of growth in the modern sectors and Tanzania's economy as a whole. Much of Tanzania's current infrastructure stock, such as roads, water supply, power system and telecommunication facilities, will require considerable capital investment for rehabilitation and expansion, if new demand is to be met.

A.4. The Tanzania long-term development plan is contained in the document "Tanzania Vision 2025". The Vision 2025 projects a growth of 8% of the economy annually by 2025. TANESCO has taken into consideration "Vision 2025" and its Corporate Business Plan presents the intention to increase power capacity at a rate of 15% per annum in order to support the economic development envisaged in "Vision 2025" It should be noted that while the mining sub sector represented only 3.5% of total real GDP (2006), the sector has grown rapidly over the past 5 years and shows promises for continued growth into the future. Tanzania's prospects depend significantly on maintaining this growth trajectory which is partly underpinned by mining, quarrying and agricultural activities. Transformation of agriculture and the tourism industry will also have significant impact in the growth of the economy.

A.5. The government has prepared a Five-year Medium Term Public Investment Plan (MPIP) to evaluate and monitor the size and nature of its infrastructural deficit. Five areas have been identified in the MPIP for the Period 2009/10 - 2014/15 as "strategic importance". These areas include:

- Improvement of transport infrastructure
- Energy infrastructure,
- Water harvesting infrastructure for irrigation
- Industrial infrastructure, particularly the provision of serviced lots for industrial parks and commercial areas; and
- Strengthening of communication infrastructure

A.6. According to this policy document, concerted and strategic measures will be taken to accelerate growth to between 12% and 15% per year in current prices and overall investment will be raised to more than 30% of GDP.

A.7. The energy sector Institutional framework: Key players, in Tanzania's energy sector includes the Ministry of Energy and Minerals (MEM), Ministry of Finance and Economic Affairs (MoFEA), TANESCO and IPP's, the Rural Energy Agency (REA), Rural Energy Fund (REF), and the Energy and Water Utilities Regulatory Authority (EWURA) and development partners such as the World Bank, the African Development Bank, the Swedish International Development Agency and Norwegian Agency for Development.

A.8. Overall, MEM is responsible for all energy-related matters including electrical power, renewable energy, coal and petroleum. As implied, the MEM has two divisions: Energy and Minerals. The energy division has four sections: Energy Development; Petroleum and Gas; Electricity; and Renewable Energy. As one of its responsibilities, the energy division formulates energy policy that includes licensing, legislation, and oversees implementation of energy policy. Additionally, the Ministry facilitates resource mobilization to ensure adequate energy services to the people. Additional roles under the energy division include supervising activities of various parastatal organisations such as the Tanzania Petroleum Development Corporation (TPDC) and Tanzania Electric Supply Company (TAN ESCO). The legal framework for the energy sector includes The Electricity Act of 2008, Petroleum Act of 2008, EWURA Act of 2001, REA Act of 2005 and the Gas Bill - 2009. The new energy policy formulated in 2003 supports the institutional framework and specifically depicts the structural changes that occurred over the last decade in the economy, as well as the social and political transformations at national and international levels

A.9. The electricity sub-sector: Tanzania Electric Supply Company Limited is a 100% wholly owned by the government, under the Ministry of Energy and Minerals. TANESCO was established early 1930s as two companies, with one private and government, and by 1957 under the Electricity Ordinance, the government had acquired all shares of TANESCO making it a 100% state-owned power utility. TANESCO is a vertically integrated company, for the generation, transmission, distribution and sale of electricity in the Tanzania Mainland. TANESCO is a sole bulk supplier of electricity in Tanzania mainland. Starting in 1980, TANESCO supplied bulk power to the Zanzibar State Fuel and Power Corporation using a 45MW, 132-kV submarine cable (38 km). Distribution of electricity in Unguja and Pemba is a sole responsibility of the Zanzibar Electricity Corporation (ZECO). TANESCO's monopoly position was ended in June 1992 to allow private sector participation in power trading. To date, a number of independent generation facilities and other supply initiatives have been established in the country and a number of others are being planned. In addition, there have been several distribution and supply initiatives, including missions and cooperatives. The Artumas Group has developed an initiative for the supply, transmission, distribution and sale of electricity in the Mtwara and Lindi regions. Some local industries are generating their own electricity. These include SAO Hill and TANWAT in the Iringa Region that use biomass. There is also

community-based generation, transmission and distribution. Religious institutions and Environmental Protection Organizations have initiated mini-power generation plants in their localities.

A.10. The Energy and Water Utilities Regulatory Authority: The Energy and Water Utilities Regulatory Authority (EWURA) is an autonomous multi-sectoral regulatory authority established in 2001 by the EWURA Act, Cap 414 of the laws of Tanzania. EWURA is responsible for technical and economic regulation of the electricity, petroleum, natural gas and water sectors in Tanzania. It became operational in June 2006 and the first management employed in September 2006. EWURA is governed by a Board of Directors. The functions of EWURA include among others, licensing, tariff review, monitoring performance and standards with regards to quality, safety, health and environment. EWURA is also responsible for promoting effective competition and economic efficiency, protecting the interests of consumers and promoting the availability of regulated services to all consumers including low income, rural and disadvantaged consumers in the regulated sectors.

A.11. Upon the receipt of a tariff increase application, EWURA acknowledges the receipt of the application as soon as possible and then has fourteen days to conduct a preliminary review approving or rejecting the request and to send feedback on the application. If the tariff is rejected, EWURA informs the applicant the reasons for rejection. If accepted, a timeline to conduct a detailed review and consultations is prepared (no more than 6 months). A public notice on inquiry is posted on EWURA's website together with the tariff application. Comments can be submitted by the public within fourteen days of the date of inquiry. EWURA's own analysis and the public comments are then synchronized. Once EWURA has made a decision on the application and the tariff increase a drafting of the Order and Exit Conference are held. This is followed by EWURA's Board Approval of the Tariff, and gazetting of the Order. Parties aggrieved by EWURA's decision can appeal to the Fair Competition Tribunal (FCT).

A.12. The current power system: The administrative regions of TANESCO generally follows political administrative region in Tanzania. The Dar es Salaam region however is composed of four TANESCO regions. There are two areas that are separated from the national grid: the western regions of Kagera, Kigoma and Rukwa and the south-eastern regions of Lindi, Mtwara and Ruvuma. There are also three main islands that are part of the United Republic of Tanzania. Of the three, Unguja and Pemba are connected but Mafia is not. The total installed capacity from both TANESCO and IPP assets amounts to about 1,003 MW. The system is hydropower dependent, constituting about 56% of total installed capacity. Thermal generating capacity forms the rest, mainly from IPPs. In the future Tanzania envisages having a hydrothermal balanced power system that would partly address power shortages experienced in the past due to drought. Tanzania, along with the sub-Saharan African countries has experienced a prolonged drought (from 2003 - 2006) and this has depleted the entire hydropower reservoir system. The situation was worst in 2006 in such a way that at the end of February 2006, the country was threatened by complete closure of Kidatu and Mtera hydropower plants, which contribute about 30% to the entire power system installed capacity. However in 2007 and 2008 the situation changed and the country received enough rainfall. In 2008 the transmission system in Tanzania operates at 220kV (3,221 km), 132kV (1,440 km), including submarine cable to Zanzibar) and 66kV (691 km). The medium and low voltage lines are 33kV (11,314 km) and 11kV (5,403 km) while the numerous distribution networks, 400/240V lines has total length of approximately 23,995 km. The peak demand reached 693.83 MW, and corresponding generation within TANESCO power system was 2,917GWh while

imports from IPPs and neighbouring countries were 1,437GWh. The total units distributed in the country were approximately 4,048GWh.

A.13. Interconnected grid system development: Up to 1979 TANESCO's Interconnected System consisted of the Coastal System of Dar es Salaam, Tanga and Morogoro and the Northern System of Arusha and Moshi. Generation was based on the Pangani River System at Nyumba Ya Mungu, Hale and Pangani Falls and the Great Ruaha River System at Kidatu, as well as thermal units atUbungo in Dar es Salaam. In 1981, the Mtera dam and the second phase of the Kidatu power station were completed and the Interconnected System was expanded to include deliveries to Zanzibar. In 1985 the grid was extended to the southwest through Iringa, Mufindi and ultimately to Mbeya and north from Iringa to Dodoma. Singida (1986), Shinyanga (1987), Mwanza (1988), Musoma (1989), Tabora (1989) and finally Tukuyu (1993) were subsequently added to the grid. In 1988, the Mtera Generating Station was added to the grid system. In 1994, the Pangani Falls Redevelopment Project was added, including a 132 kV transmission line to Tanga. A new second 220-kV transmission line from Kidatu to Dar es Salaam was constructed in 1995. Another 220-kV transmission line from Singida to Arusha was also constructed in 1997. Two gas turbine units at Ubungo with a total installed capacity of 37 MW were installed in 1994 and an additional two gas turbines with 75 MW total installed capacity in 1995. In 2002, a 220 kV transmission line from Lower Kihansi to Iringa and Kidatu were added. In 2008 a gas plant with total installed capacity of 100MW was added at Ubungo while another 45MW gas plant is under construction at Tegeta Dar es Salaam and is expected to be commissioned in October 2009. The generation capacity additions in the grid system reflected the government initiatives towards current power sector reforms in the country.

A.14. Further interconnection of isolated centres will continue by linking the remaining regions of Pemba (2010), Ruvuma (2012), Kigoma (2018), Kagera (2016), Rukwa in 2018 while Lindi and Mtwara will be interconnected into the main grid by 2017. It is also important to note that power supply situation is now plentiful in Mtwara, including supply to Lindi. Therefore the required efforts would be resource allocation to enable TANESCO accelerate customer connections in the two regions starting from 2017.

A.15. It was in this context that the new HV transmission line project was proposed as part of TANESCO’s short-term strategy for National Grid transmission line reinforcement. The line will link existing and future generating sources in the south and southwest of Tanzania to the load centers in the Mwanza and Arusha regions in the North. In addition there are plans to interconnect Tanzania with Kenya and Zambia. Due to this situation TANESCO is planning a project to reinforce its transmission backbone to a level where it can satisfy these technical requirements.

Table 1: Demand forecast for up to year 2033

Year	***Sum of Peak - MW***	***Coincidental Peak - MW***
2009	769	764
2010	907	900
2011	1005	998
2012	1102	1094
2013	1219	1210
2014	1342	1333
2015	1482	1471
2016	1604	1593
2017	1791	1778
2018	1939	1925

2019	2070	2055
2020	2218	2202
2021	2378	2361
2022	2554	2536
2023	2760	2740
2024	2972	2951
2025	3200	3177
2026	3462	3437
2027	3742	3715
2028	4067	4038
2029	4394	4362
2030	4761	4726
2031	5161	5124
2032	5609	5569
2033	6091	6047

Table 2: Tanzania's Generation Expansion Plan (20011-2030)

Project	Capacity (MW)	Estimated cost ($ Million)	Envisaged Commercial Operational Date (COD)	Resource
Short term				
Ubungo EPP	100	100	2011	Gas
Mwanza MS Diesel	60	80	2011	Diesel
Wind	50	50	2012	Wind
Kiwira I	200	274	2014	Coal
Kinyerezi	240	216	2013	Gas
Rusumo falls	21	86	2015	Hydro
Interconnector I	200	760	2015	
Medium term				
Ruhudji	358	495	2016	Hydro
Malagarasi	8		2016	Hydro
Mnazi Bay	300		2013	Gas
Mtwara Artumas	12		2013	Gas
Rumakali	222	456	2018	Hydro
Stiegler's Gorge I	300	873	2020	Hydro
Interconnector II	200		2021	
Long term				
Stiegler's Gorge II	600	311	2023	Hydro
Ngaka	400	840	2024	Coal
Mchuchuma I+II	400	840	2025	Coal
Stiegler's Gorge III	300	255	2026	Hydro
Nyasa Coal	200	600	2027	Coal
Kakono	53	90	2027	Hydro
Mpanga	144	249	2028	Hydro
Masigira	118	209	2028	Hydro
Ikondo -Mnyera	340	641	2029	Hydro
Taveta -Mnyera	145	380	2030	Hydro

A.16. The supply of power in Tanzania is very limited with demand far outstripping supply. At the same time, the country faces a growing demand for energy from the private sector as it

increasingly focuses on private sector investments. In order for TANESCO to meet the ever growing energy demands and bolster accessibility, TANESCO has set out an ambitious investment plan (presented in the PSMP 2009). For these plans to materialize, the Government has approached several donors to assist in financing of the various projects. The principal donors currently active in the energy sector include the World Bank, African Development Bank, European Investment Bank, Norway, Sweden, Japan (JICA), Korea (EDCF), MCC and EU.

A.17. The World Bank is supporting the following projects: (a) conversion of IPTL power plant from HFO to gas, (b) Tanzania's Energy Development and Access Expansion Project (TEDAP) which aims to improve the quality and efficiency of electricity service provision in the three main growth centers of Dar es Salaam, Arusha, and Kilimanjaro. Furthermore, TEDAP will establish a sustainable basis for energy access expansion and renewable energy development in Tanzania; (c) provision of legal, financial and technical advisers to MEM including assisting with preparatory studies and consultancies for capacity development of MEM and TANESCO.

A.18. Norway is also an active member in the sector with a focus on rural electrification by financing feasibility studies for small hydro power plants and interconnection between Kenya and Tanzania; strengthening EAC-Energy Secretariat, support to capacity building and institutional strengthening of East African Power Pool, and capacity building to TANESCO and Tanzania Traditional Development and Environment Organisation; as well as support to Zanzibar by installing the Pemba-Tanga submarine cable including substations and overhead lines, by supporting Phase IV of Rural Electrification programme and by providing emergency back-up capacity (with co-financing from DFID and SIDA). Sweden has been providing strong support to rural electrification through transmission lines and extension projects, supporting Rural Energy Fund and capacity building of the Rural Energy Agency. They are also involved in the rehabilitation of Hale Hydropower plant, rural solar PV market facilitation and the Zanzibar energy sector support.

A.19. JICA is providing support for the construction of a new substation in Dar es Salaam as well as constructing a new - 132 kV line; rehabilitation of substation and transmission line in Kilimanjaro and capacity building to TANESCO to improve transmission and distribution systems. Korea through EDCF is involved as part of the TEDAP in the construction of new 132kV transmission line between Kilimanjaro and Arusha and rehabilitation of substation.

A.20. The Millennium Challenge Corporation (MCC) is involved in two big projects namely rehabilitation and extension of distribution lines in several unserved areas of the country as well as building the 100 MW submarine cable between Mainland and Unguja (Zanzibar) including construction of new overhead lines and complementary expansion of substations.

Table 4: Backup of Key arguments of the report

Project	Date & Amount	Intervention Areas	Rating	Lessons Learned
El Nino Infrastructure Réhabilitation Project	November 1998 UA 11.52 million	Rehabilitation of water and roads infrastructure in the affected areas of Western, Nyanza and Eastern provinces	3.0	(i) Adequate recognition of country and potential project risks is essential to the reduction of implementation delays. (ii) The capacity of project implementation unit must be enhanced through direct capacity building or technical assistance to avoid implementation delays (iii) Bank oversight is crucial to ensure adequate results monitoring (iv) Project readiness at entry is important to avoid delays during implementation
Agricultural Sector Adjustment Operation II	February 1991 UA 24.43 million	Providing balance of payments assistance to support the government's efforts of promoting agricultural growth by removing policy constraints, stimulating investment and supporting institutional development.	2.0	(i) Performance contracts that are signed between governments and regulatory bodies should be designed to be more binding on both parties. (ii) Sector policies should not become politicized. It is equally critical to ensure continuity between sector strategies, and to avoid 'stop-and-go' policy reversals. (iii) M&E at Ministry level need to be functional and involved Departments/Agencies in close collaboration, to facilitate procurement processes, audit and reporting. This is critical to avoid slippage in implementation time. (iv) The Bank should closely monitor the project to ensure compliance with loan covenants, and avoid slippage.

B.2. Project Costs

Table 5: Detailed cost estimates

Description	F/C Portion	L/C Portion	Total
	Cost estimate in TUS$	**Cost estimate in TUS$**	**Cost estimate in TUS$**
A Line and Substations			
Package 1:			
Line Section Iringa - Dodoma	105,705	11,745	117,450
Physical Contingencies (10%)	10,571	1,175	11,745
Price Contingencies (4% F/C, 5% L/C))	4,651	646	5,297

Subtotal Package 1	**120,927**	**13,565**	**134,492**
Package 2:			
Line Section Dodoma - Singida	101,947	11,327	113,274
Physical Contingencies (10%)	10,195	1,133	11,327
Price Contingencies (4% F/C, 5% L/C))	4,486	623	5,109
Subtotal Package 2	**116,627**	**13,083**	**129,710**
Package 3:			
Line Section Singida - Shinyanga	105,705	11,745	117,450
Physical Contingencies (10%)	10,571	1,175	11,745
Price Contingencies (4% F/C, 5% L/C))	4,651	646	5,297
Subtotal Package 3	**120,927**	**13,565**	**134,492**
Package 4:			
Substations	**30,570**	**945**	**31,516**
Physical Contingencies (10%)	3,057	95	3,152
Price Contingencies (4% F/C, 5% L/C))	1,345	52	1,397
Subtotal Package 4	**34,972**	**1,092**	**36,064**
Subtotal EPC Costs	**393,452**	**41,306**	**434,758**
Package 5			
B. Procurement of Distribution Material	3.38	-	3.38
Physical Contingencies (10%)	0.34	-	0.34
Price Contingencies (4% F/C, 5% L/C))	0.15	-	0.15
Subtotal Package 5	**3.87**	**-**	**3.87**
C. Technical Assistance			
Consulting Services	7,000	1,000	8,000
Price Contingencies (4% F/C, 5%L/C)	280	50	330
Subtotal Consulting Services	**7,280**	**1,050**	**8,330**
Capacity Building to TANESCO	4,000	1,000	5,000
Price Contingencies (4% F/C, 5% L/C)	160	50	210
Subtotal Capacity Building	4,160	1,050	5,210
Subtotal Technical Assistance	**11,440**	**2,100**	**13,540**
D. Compensation & Environment			

Mitigation Measures	-	7,816	7,816
Compensation	-	6,815	6,815
Land Acquisition	-	2,683	2,683
Price Contingencies (4% F/C, 5% L/C)	-	866	866
Subtotal Compensation & Environment Costs	**-**	**18,179**	**18,179**
Project Cost (A+B+C+D)	**404,896**	**61,585**	**466,481**
Interest during construction (IDC)	-	10,150	10,150
Total financing requirements	**404,896**	**71,735**	**476,631**

B.3. Implementation Arrangements

Executing Agency

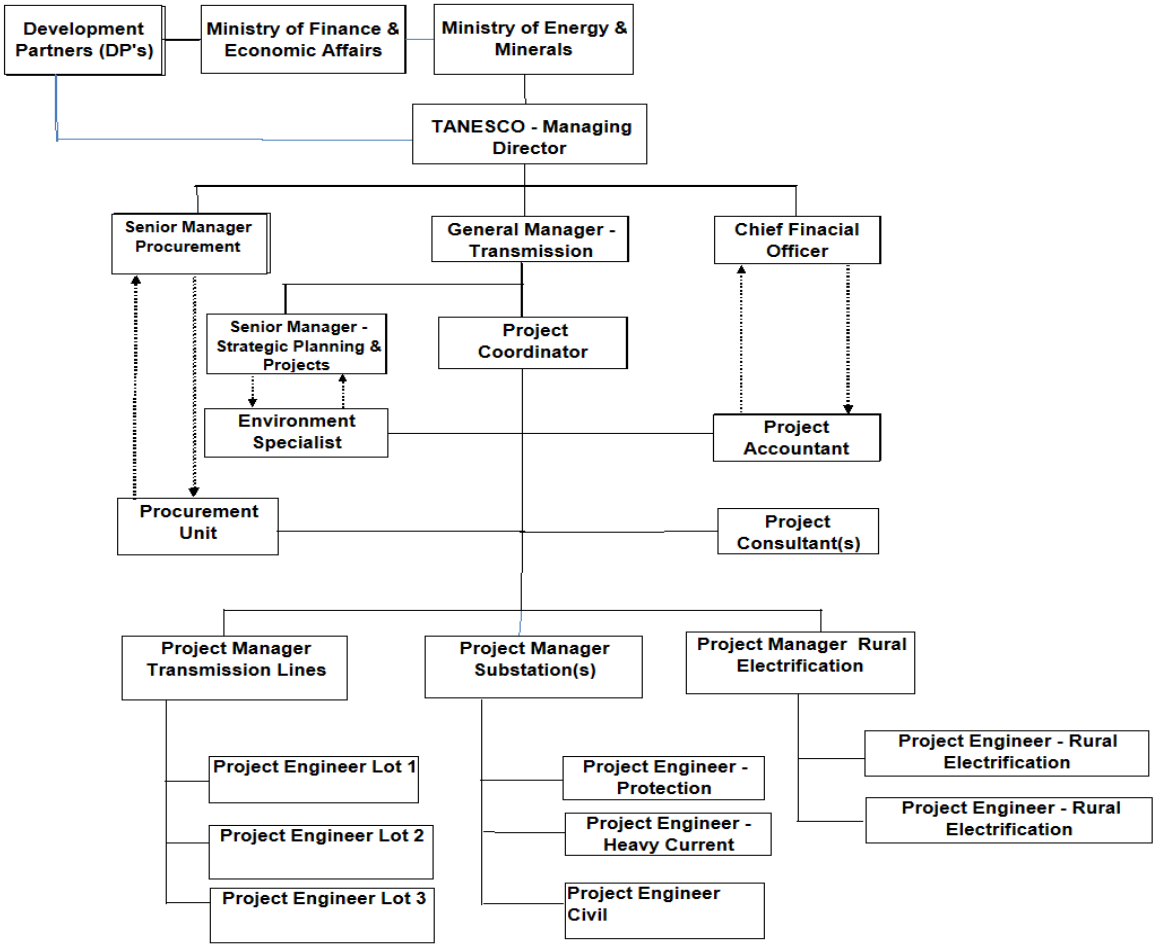
3.1 TANESCO is the Executing Agency and Beneficiary of the proposed loan. TANESCO will be individually responsible for financial, procurement and physical monitoring reports on implemented activities relating to the project.

Institutional Arrangements

3.2 TANESCO shall appoint a Project Coordinator with primary responsibility for follow-up and oversee the day-to-day implementation of the various components/activities of the Project. The TANESCO's Project Coordinator shall also be responsible for ensuring that reports at all stages of the Project are prepared by the Consultants and contractors and that the views of the Governments and the financers are duly incorporated. The TANESCO Project Coordinator shall report to the General Manager Transmission of TANESCO:

3.3 TANESCO shall establish a Project implementation unit (PIU). Staff will be assigned to support this PIU. The PIU will manage all aspects of Project implementation, headed by the General Manager Transmission. The PIU shall include Project Coordinator, Project Managers for Substation Lot, Transmission Lots and Rural Electrification, dedicated Project accountant, dedicated procurement unit and environmental monitoring unit. The Consultant would be an integral part of this informal PIU and will report to the General Manager Transmission. Additional supervisors and counterpart staff to the project consultant will also be assigned by TANESCO as necessary.

Figure 1: TANESCO's Organizational Scheme for Implementation of the BTIP[1]



B.4. Financial Management and Disbursement Arrangements

B.4.1 Financial Management

B.4.1 The financial management system review of TANESCO covered the evaluation of adequacy of its organizational structure, Accounting and Internal control procedures, the oversight role of the Internal Audit Department, the External auditors and the Audit Committee. The purpose was to get assurance on the adequacy of the features, controls and procedures in ensuring that the project resources will be used only for the purposes for which the funds were intended with due regard to efficiency and economy during project implementation and beyond.

Organization Structure

B.4.2 TANESCO is a parastatal organization under the Ministry of Energy and Minerals headed by a Managing Director. He is appointed by the President of the United Republic of

[1] During appraisal, the Bank made recommendations about the members that will constitute the implementation team for the project.

Tanzania, but reports to the Board of Directors whose Chairman is also appointed by the President. The rest of the Board members are appointed by the Minister. The Chief executive is assisted by three (3) General Managers and the Chief Finance Officer. The Projects are under the General Manager transmission who is assisted by the Senior Manager projects and Manager Projects. The Accounting and Finance portion is managed by the Finance Department (integrated into TANESCO's financial system, but distinguished by accounting codes). Overall the organization is adequately staffed with regards to finance and project management.

Accounting and internal Control Procedures

B.4.3 TANESCO maintains financial policies and Procedure manuals with clear accounting and internal control procedures in place. The document is a comprehensive document with adequate controls, checks and balances for process and procedure. It has set out the areas of involvement of the Board of Directors, Managing Director, General Managers, Chief Finance Officer and other staff with clear limits of authority. Furthermore, it contains detailed policies for sales, procurement, stores management, Finance and Reporting, budgeting, capital expenditure and human resources. TANESCO is also using **iScala** accounting package which is integrated with the customized billing system **HiAffinity**.

Accounting policies and procedures

B.4.4 The project will use International Financial Reporting Standards (IFRSs) and International Standards on Auditing (ISAs). The Financial policies and Procedure manuals and Audit manual of TANESCO updated in 2009 are in line with IFRs and ISAs.

Oversight roles of Internal and External Audits and Audit Committee

B.4.5 TANESCO has an internal audit department headed by a Chief Internal Auditor who reports administratively to the Chief executive and functionally to the Audit Committee of the Board of Directors. He is assisted by two Senior Manager s (one responsible for Internal Audit and the other systems Audit). The terms of reference of the Internal audit department stipulated in the Audit manual are broad and include the internal audit charter, Standards of Practice and code of conduct, strategic planning, Internal audit annual planning, risk based approach, reporting, follow up, audit evidence , working papers and audit evidence. The department is operational independent with unrestricted access to all records, property and personnel. The Department has a total number of thirty-three staff with senior staff having plenty of internal audit experience and supported by staff with relevant fields to the internal audit.

B.4.6 The oversight of the TANESCO activities is provided by the Audit Committee whose purpose is to assist the Board of Directors in fulfilling the Boards responsibilities of aligning to corporate governance responsibility. The terms of reference of the Audit Committees meet the benchmark Audit Committee Responsibilities. The Audit Committee is expected to meet at least four times per year and more frequently as need be and as determined by the chairperson. Review of minutes of committee meetings show that they meet and discuss audit issues at length.

B.4.7 The final oversight role on the activities of TANESCO is provided by the CAG who by virtue of the provisions of Article 143 of the Constitution of the United Republic of

Tanzania of 1977 (revised 2000), and section 30 (1) of the Public Finance Act No. 6 of 2001 (revised 2004), is the appointed statutory auditor of revenue and expenditure of all ministries, departments of the government, public authorities and other bodies or authorities which receives funds from the Consolidated Fund. Section 32 of the same Act and Section 33 of the Public Audit Act No 11 of 2008 empowers him to authorize any person eligible to be appointed as an auditor of a company or auditor under the Auditors and Accountants (Registration) Act, 1972 or any public officer to conduct an inquiry, examination or audit on his behalf. Over the last three years 2007, 2008, 2009 PricewaterhouseCoopers has been auditing the books of TANESCO on behalf of the CAG. Reviews of the audit reports for the 2008 provide comfort as to the depth of work of the auditors. International Audit standards and Accounting Standards are used. The audit reports and management letter indicate weakness in the internal control system such as control over inventory, reconciliations, follow up and approval of transactions and maintenance of records.

The management of TANESCO has shown commitment by recruiting a consultant who is reviewing the whole financial system including procurement to come up with recommendations that will improve the system.

Reporting and Monitoring

B.4.8 Financial reporting will be done within six months of fiscal year end. This will be done through submission of an audit report to the Bank by the independent auditor on the basis of the Bank's audit TOR. The EA will also submit quarterly reports to the Bank. The Bank will augment this monitoring and reporting by carrying out at least two supervision missions annually

B.4.2 Disbursement

B.4.2.1 The disbursement of the ADF loan will be on the basis of the direct payment method. All funds from the loan resources will be paid directly to the contractors and the auditor. The invoices shall be approved by TANESCO before preparation and authorization of the disbursement applications by the Ministry of Finance and Economic Affairs. However, if required and after approval from the Bank, other methods of disbursement of namely, Reimbursement to borrower, Reimbursement Guarantee, and Revolving Fund or Special Account could be used. The details of how each method can be used are provided in the Disbursement handbook. TANESCO will be required to open special accounts to receive project funds for audit consultancy costs.

B.5 Procurement Arrangements

A. General

B.5.1 All project procurement activities to be financed by the ADF/JICA will be in accordance with the Bank's Rules and Procedures for Procurement of Goods and Works or, as appropriate, Rules and Procedures for the Use of Consultants using appropriate bidding documents acceptable to the Bank. However, on the procurement of contractors for supply and installations works, the parties have agreed to a common approach whereby World Bank bidding documents will be used.

Table 6: ADF Categories of expenditure (Mill UA)

	Categories of Expenditure	FC	LC	Total Cost
A	**Works**			
	- Line Section Dodoma - Singida	38.41	4.31	42.72
B	**Goods**			
	- Distribution Materials	2.55	-	2.55
C	**Services**			
	- Project Audit	-	0.09	0.09
	Total Costs	**40.96**	**4.40**	**45.36**

Procurement of Works:

B.5.2 Works relating to construction of transmission lines will be procured through International Competitive Bidding procedures on a supply and installation basis through Prequalification Process. To ensure a cost-effective implementation of the project and to identify the least cost combination of bids with possible cross discounts, it was agreed among the financiers to use one prequalification document acceptable to all and TANESCO. Accordingly, The World Bank Standard Prequalification Document for Procurement of Works August 2006 revised May 2007 shall be used for all the three lots. In addition, the World Bank Standard Bidding Document for Procurement of Plant, Design, Supply, and Installation April 2008 shall be used for all the three lots. One bidding document shall be used with three schedules of prices for each section of the line. However, the bidding documents shall be customized to specific financier requirements through the bid data sheet. One evaluation report covering each lot will be produced and submitted to each financier. When agreement is reached among the financiers on the evaluation report each financier will give no objection to the executing agency. Contract will be awarded at the same time for all sections of the line to facilitate the implementation of the project in a coordinated manner.

Procurement of Service:

B.5.3 The World Bank will finance the total cost of the consultancy services for supervision works and capacity building for the whole project. The consultants will procured in accordance with World Bank Procurement Guidelines through international competition under Quality and Costs Based Selection.

Procurement of Goods:

B.5.4 The Bank is financing procurement of distribution materials for the project using ICB.

Miscellaneous

B.5.5 The AfDB shall also finance the procurement of miscellaneous items and services under the project estimated to costs UA 0.09 million. The values of individual miscellaneous items and services are anticipated to be very small and therefore the National Shopping shall be applicable for procurement of miscellaneous goods, while the Least Cost Selection method and Selection of Individual Consultants methods shall be applicable for procurement of miscellaneous services.

General Procurement Notice

B.5.6 The text of a General Procurement Notice (GPN) will be agreed with The Tanzania Electric Supply Company (TANESCO) and it will be issued for publication in UN Development Business Journal, upon approval by the Board of Directors of the Loan Proposal.

Review Procedures

B.5.7 The following documents are subject to review and approval by the Bank before promulgation: ❍Specific Procurement Notice, ❍Prequalification Invitation Document, ❍ Evaluation of Prequalification Submissions ❍Tender Documents ❍Tender Evaluation Report and Draft contract.

Executing Agency

B.5.8 The Tanzania Electric Supply Company (TANESCO) will be responsible for the procurement of works and consulting services. The resources capacity and experience of TANESCO have been reviewed and are determined to be adequate to carry out the procurement activities required for the project. All TANESCO's procurement activities are carried out under Procurement Management Unit (PMU) headed by Senior Manager Procurement who is reporting directly to the Managing Director. The organization structure of PMU is shown in the in the Annex B5 (i).

B.5.9 The TANESCO has long experience of managing donors' financed projects using international procurement guidelines like the ones of African Development Bank, World Bank etc; the Company is currently implementing number of donors supported projects including procurement activities for "Electric V Project" under AfDB. As for the Iringa - Shinyanga Transmission Line Project, the TANESCO has hired a consultant namely M/s Fichtner GmbH of Germany support the preparatory technical activities of the project, the same consultants is expected to support the procurement activities for hiring the works contractor. However, the procurement of construction supervisory consultant shall be fully managed the Procurement Management Unit of the Company.

B.5.10 The lesson learned by the ADB through Electric V Project, is that the efficiency of TANESCO in managing the procurement activities need to be improved in order to manage properly the project. The Bank however is very optimistic that the decentralization practice that has taken place within TANESCO is likely to reduce substantially the procurement workload at the head office and eventually increase the efficiency of the PMU in managing the procurement activities including the ones under Iringa - Shinyanga Transmission Line Project. Therefore no immediate procurement capacity support is planned by the Bank.

Procurement Plan

B.5.11 The Bank shall review the procurement arrangements to be proposed by the Borrower in the Procurement Plan for its conformity with the Loan Agreement and its Rules. The Procurement Plan shall cover an initial period of at least 18 months. The Borrower shall update the Procurement Plan on an annual basis or as needed always covering the next 18 months period of project implementation. Any revisions proposed to the Procurement Plan shall be furnished to the Bank for its prior approval.

B.6 Audit Arrangements

The project accounts and financial statements of TANESCO will be audited annually; in accordance with internationally acceptable accounting standards and acceptable to the Bank. The company has already established an internal audit service to audit the financial statements and produce audit reports for review both by the Management Committee and Board of Directors. The Comptroller and Auditor General can appoint an external private firm of auditors to carry out the audit on his/her behalf for no more than three years although final responsibility remains his/hers. Over the last four years 2005, 2006, 2007 and 2008, the accounts of the TANESCO have been audited by PricewaterhouseCoopers (PwC). Reviews of the audit reports for the above mentioned periods provide comfort as to the depth of work of the auditors. International and acceptable Tanzanian Accounting Standards are used. Furthermore the accounts and audit reports were prepared and audited within a reasonable time period i.e. within six months of the year end.

B.7 Basic Assumptions for Financial and Economic Analysis

B.7.1 Financial Analysis

B.7.1.1 The key assumptions and results of the financial analysis are presented below:

- All project cost assumptions for the project are based on the forecasts presented in the feasibility study and prepared by Fichtner, the project consultant. The total investment costs of the project are spent over a 3 year period, starting in early 2011.
- The life of the project is 30 years
- The expected High Voltage Retail Tariff (HVRT) is taken from the proposed multi-year tariff increase rates (2011 -2014) to the current HV retail rates. The LRMC of generation is assumed to be about US$ 6.45 cent/kWh (according to the 2008 PSMP).
- The expected wheeling tariff of 4.86 USc/kWh is used for the analysis
- Grace period varies depending on lenders criteria. However, most give 10 years as grace period with the exception of EIB
- Percentage of total debt is: IDA – 30.2%, EIB – 32.8%, AfDB – 14.9%, JICA – 14.1%, KEXIM – 8%
- Interest during construction is estimated at $14.2 million
- The wheeling tariff is as estimated in the Tanzania Power Master Plan Study.
- 1 EUR = USD 1.45 and 1 USD = 1,268.06 TShs
- Market based financial discount rate of 12% is used which is line with globally accepted DR to benefits arising from similar projects.
- Income tax is assumed to be 30%
- The annual Operating and Maintenance (O&M) costs of the project are estimated at 1% of the total project costs for civil works per Fichtner's report.

Table 7: Debt Financing Terms

Lender	Type of Loan	Amount (US$ mil.)	Maturity (Years)	Grace Period (Years)	Interest Rate (per annum, payable semi-annually)	Onlending Terms
IDA	Concessional	148.03	40	10	0.75%[2]	equivalent as to GOT
AfDB	Concessional	65.00	50	10	0.75%	equivalent as to GOT
JICA	Concessional	64.86	50	10	0.01%	equivalent as to GOT
Korea EDCF	Tied Concessional	36.06	40	15	0.01%	equivalent as to GOT
EIB	Non-concessional	134.49	25	5	5.40%	equivalent as to GOT

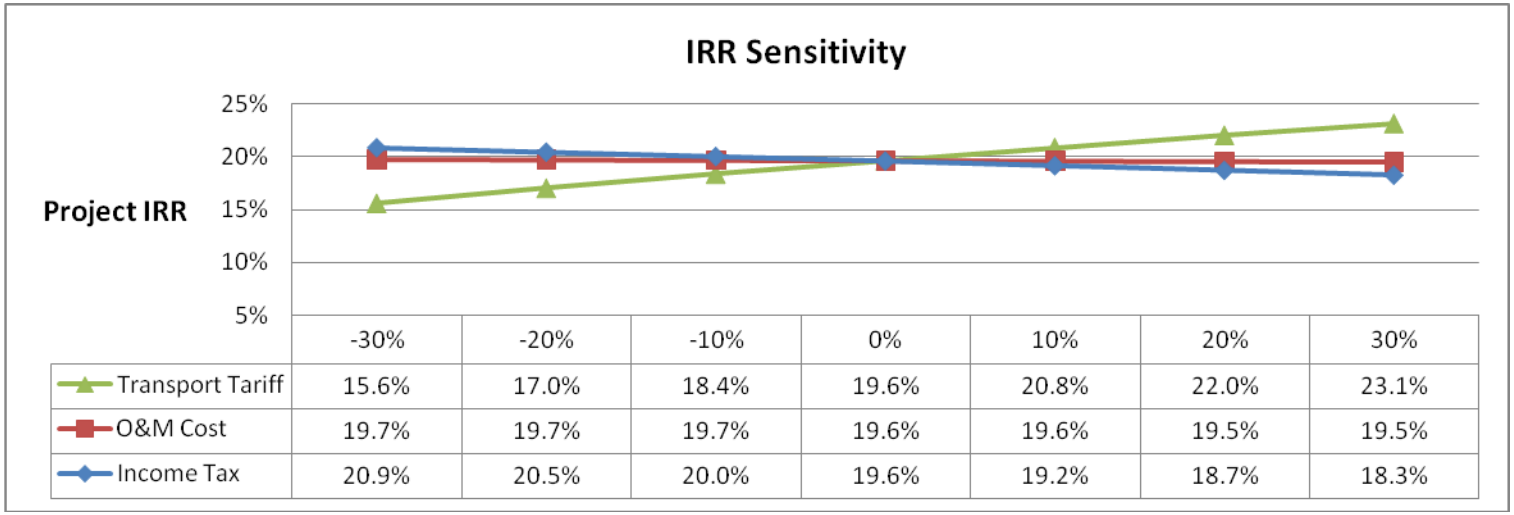
B.7.1.2 As mentioned earlier, in order to analyse the project's debt servicing capacity, the operating financials and debt repayment schedules were modelled under a "project finance" structure, with a Special Purpose Vehicle (SPV) set up for the financing of this transaction and responsible for paying all project debt costs from project cashflows.

B.7.1.43 Although the various debt tranches and debt finance conditions are subject to change, it has been assumed that any changes will have a minimal effect on the financing results since it was developed on a conservative basis.

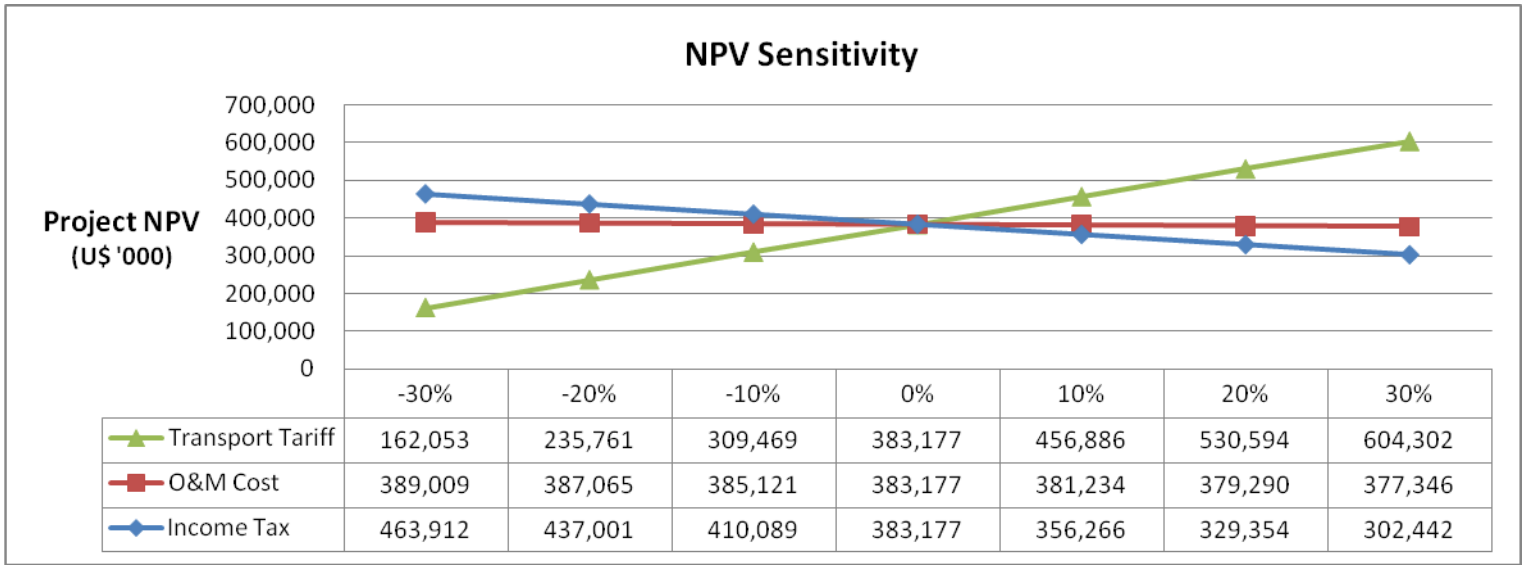
B.7.1.4 The analysis of the Base Case scenario shows that Debt Service Coverage Ratio (DSCR) for the project stands at acceptable levels 3.64x Year 1, 6.78x on average over Years 1-7. This level of debt coverage is achievable thanks to the concessionary nature of the loans from ADF, WB, KEXIM, JICA and the possible interest rate subsidy from EIB.

[2] In the case of IDA, interest rate is 0% and service charge is 0.75%..

Figure 2 IRR and NPV sensitivity



	-30%	-20%	-10%	0%	10%	20%	30%
Transport Tariff	15.6%	17.0%	18.4%	19.6%	20.8%	22.0%	23.1%
O&M Cost	19.7%	19.7%	19.7%	19.6%	19.6%	19.5%	19.5%
Income Tax	20.9%	20.5%	20.0%	19.6%	19.2%	18.7%	18.3%



	-30%	-20%	-10%	0%	10%	20%	30%
Transport Tariff	162,053	235,761	309,469	383,177	456,886	530,594	604,302
O&M Cost	389,009	387,065	385,121	383,177	381,234	379,290	377,346
Income Tax	463,912	437,001	410,089	383,177	356,266	329,354	302,442

Figure 2: Detailed calculations of ENPV and EIRR.

I) Least cost assessment		25%	25%	35%	15%				TC= US$ 476,627						
Item	**Unit**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2020**	**2025**	**2030**	**2035**	**2036**	**2037**	**2038**	**2039**
		1	**2**	**3**	**4**	**5**	**6**	**11**	**16**	**21**	**26**	**27**	**28**	**29**	**30**
Investment new	**T US$**	119,157	119,157	166,819	71,494	0	0	193,668	0	0	0	0	0	0	-263,502
O & M costs	**T US$**				993	4,766	4,766	6,703	6,703	6,703	6,703	6,703	6,703	6,703	4,068
ENS from outage	**T US$**	0	0	0	61	1,197	2,807	9,705	14,502	17,519	17,724	17,724	17,724	17,724	17,724
- ENS	GWh	0	0	0	0.04	0.75	1.76	6.08	9.09	10.98	11.11	11.11	11.11	11.11	11.11
Losses	**T US$**	0	0	0	1,830	16,278	30,674	82,642	58,849	108,963	116,514	116,514	116,514	116,514	116,514
- Losses in line operation	GWh	0	0	0	11	94	176	475	338	626	670	670	670	670	670
Total cost	**T US$**	119,157	119,157	166,819	74,377	22,241	38,248	292,718	80,055	133,185	140,940	140,940	140,940	140,940	-125,197
Energy Flow Iringa - Singida	GWh	0	0	0	315	2,005	2,659	4,202	6,423	7,404	7,404	7,404	7,404	7,404	7,404
Energy Flow Singida - Shinyanga	GWh	0	0	0	210	1,487	2,194	3,765	5,344	7,151	7,404	7,404	7,404	7,404	7,404
Present value of cost	**935,724**	**T US$**													
Levelised costs	**3.078**	**US$-cent /kWh**													
- PV of cost	**935,724**	**T US$**													
- PV of energy	**30,400**	**GWh**													
II) Economic project evaluation															
Item	**Unit**	**2010**	**2011**	**2012**	**2013**	2014	2015	2020	2025	2030	2035	2036	2037	2038	2039
		1	**2**	**3**	**4**	5	6	11	16	21	26	27	28	29	30
Total economic costs	**T US$**	**119,157**	**119,157**	**166,819**	**74,377**	22,241	38,248	292,718	80,055	133,185	140,940	140,940	140,940	140,940	-125,197
- Investment costs	**T US$**	**119,157**	**119,157**	**166,819**	**71,494**	0	0	193,668	0	0	0	0	0	0	-263,502
- O&M costs	**T US$**	**0**	**0**	**0**	**993**	4,766	4,766	6,703	6,703	6,703	6,703	6,703	6,703	6,703	4,068
- Costs of outages	**T US$**	**0**	**0**	**0**	**61**	1,197	2,807	9,705	14,502	17,519	17,724	17,724	17,724	17,724	17,724
- Energy losses	**T US$**	**0**	**0**	**0**	**1,830**	16,278	30,674	82,642	58,849	108,963	116,514	116,514	116,514	116,514	116,514
Economic benefits Iringa-Singida	**T US$**	**0**	**0**	**0**	**32,457**	206,381	273,793	432,565	661,203	762,282	762,282	762,282	762,282	762,282	762,282
Economic benefits Singida-Shinyanga	**T US$**	**0**	**0**	**0**	**14,904**	105,564	155,771	267,319	379,430	507,726	525,712	525,712	525,712	525,712	525,712
- Energy transports															
Energy Flow Iringa - Singida	GWh	**0**	**0**	**0**	**315**	2,005	2,659	4,202	6,423	7,404	7,404	7,404	7,404	7,404	7,404
Energy Flow Singida - Shinyanga	GWh	**0**	**0**	**0**	**210**	1,487	2,194	3,765	5,344	7,151	7,404	7,404	7,404	7,404	7,404
- Costs of supply Iringa-Singida	**T US$**	**0**	**0**	**0**	**22,400**	142,432	188,955	298,531	456,323	526,082	526,082	526,082	526,082	526,082	526,082
- Costs of supply Singida-Shinyanga	**T US$**	**0**	**0**	**0**	**10,286**	72,854	107,504	184,488	261,860	350,402	362,815	362,815	362,815	362,815	362,815
- Benefit of delivered energy Iringa-Singida	**T US$**	**0**	**0**	**0**	**54,856**	348,814	462,748	731,097	1,117,526	1,288,364	1,288,364	1,288,364	1,288,364	1,288,364	1,288,364
- Benefit of delivered energy Singida-Shinyanga	**T US$**	**0**	**0**	**0**	**25,190**	178,418	263,275	451,807	641,291	858,128	888,527	888,527	888,527	888,527	888,527
Economic net benefit Iringa-Singinda	***T US$***	***119,157***	***119,157***	***166,819***	***-41,921***	*184,140*	*235,545*	*139,847*	*581,148*	*629,097*	*621,342*	*621,342*	*621,342*	*621,342*	*887,479*

NPV IS	**2,193,911**	**T US$**
EIRR IS	**35.610%**	%

B.7.2 Economic Analysis

B.7.2.1 The economic benefits of the power transmission lines project is determined by comparing the benefits of electricity deliveries to the north and north-east of Tanzania with the costs of the interconnection. Essentially, if the backbone transmission line is not constructed, industrial and household consumers in the concerned region would use electricity generated by small thermal power plants. Therefore the benefits of the line are the annual savings (avoided costs) resulting from the difference in the unit costs of small thermal plants and the unit costs of the power supplied via the new line. The economic analysis was developed based on the following assumptions and conversion factors:

- **Discount rate:** 10%
- **Exchange rate US Dollar - Euro:** The exchange rate of 1.45 US Dollar / Euro is taken for this analysis. This value is based on the development of the average quarterly spot exchange rates of the years 2007, 2008 and 2009.
- **Assessment period:** 2010 till 2039, a total of 30 years.
- **Cost of un-served energy** (energy not served - ENS) depends on the perceived cost of outages (lost energy) to consumers. The derived figures are valued at 1.10 US$/kWh (or 0.8 Euro / kWh).
- **The cost of electricity** (electricity transported via the backbone line) is valued by applying the long-run marginal costs (LRMC) for generation (from 2009 Power Sector Master plan) determined is valued at US-cent4.9/kWh (0.034 Euro/kWh) for the period of 2016 till 2031.
- To **compensate for the transmission losses** the unit costs as given in the Power Sector Master Plan at 0.12 USD / kWh or 0.08 Euro / kWh, considering a 80 % availability.
- **Lifetime of equipment**: The assumed lifetime of the investment is 50 years which is in line with TANESCO's depreciation rates for equipment. At the end of the assessment period a salvage value has been considered.
- The repartition of the investment over the four-year construction period of Phase I is as follows:25% in 2011; 25% in 2012; 35% in 2013; 15% in 2014
- **O & M costs: T**he O & M costs were according to international standards for this type of studies, using percentages of the investment costs, 1% of total investment costs is applied.
- **Energy transport:** The energy transported from Iringa to Shinyanga for the Period 2012 till 2038 was calculated using the results of the load flow calculations performed for the years 2012, 2016 and 2020. The values for the remaining years were estimated by extrapolation.
- **Development of electricity losses:** The energy losses on the Iringa – Shinyanga axis have been calculated based on the power flow from 2012 till 2038. The losses depend on the considered transmission alternative.
- All taxes and subsidies were deducted from the financial values

Figure 2 above shows detailed calculations of ENPV and EIRR.

B 7.3- Sensitivity Analysis

B.7.3.1The economic rate of return parameter of the project was tested against the risks identified as possible downsides during implementation or operation of the project. These risks are +20% and -20% changes (i) variation of the load; (ii) cost of loss compensation, (iii) variation id discount rate, (iv) variation of investment cost (v) variation of exchange rates and

(vi) variation in cost of transported power. The resilience of the economic benefits of the project was tested by running a number of sensitivity scenarios. In each case the ENPV and EIRR were computed and the results of the above sensitivity tests confirm that the return parameters of the project are robust under the most likely risks to which the project can be confronted as follows:

Table 8: Results of Sensitivity Tests

Costs of loss compensation (Euro/kWh)	**-ve20%**		**+ve20%**
Net present value (M USD	2,373.30		2,262.10
Economic internal rate of return (%)	37.00		36.20
Levelised costs USD / kWh)	2.17		2.53
Variation of the Discount rate	**6%**		**16%**
Economic NPV (M USD)	3,023.20		1,612.20
Present value of costs (T USD)	1,015.70		711.44
Levelised costs (USD / kWh)	3.34		2.34
Variation of the Investment costs	**-ve20%**		**+ve 20%**
Economic Internal Rate of Return (%)	40.60		31.90
Net Present Value (M USD)	2,280.60		2,107.00
Levelized costs (USD/kWh)	2.53		2.99
Variation of the exchange rate USD/Euro	**-** **-ve20%**		**+ve20%**
Exchange Rate (USD/Euro)	1.16		1.74
Economic Internal Rate of Return (%)	28.80		22.20
Net Present Value (M USD	1,209.00		681.00
			1.84
Variation of the cost of transported power	**-ve20%**		**+ve20%**
Economic Internal Rate of Return (%)	42.20		38.50
Net Present Value (M USD)	1,152.48		741.93

B7. Environmental and Social Analysis

B7.1 Environmental Review, Key Findings and Recommendations

B7.1.1 The proposed project intends to reinforce the existing 220kV transmission line from Iringa to Shinyanga by constructing approximately 700 km of 400 kV electrical power transmission line and associated facilities. Key components of the project shall include the way-leave, i.e. land set aside for the transmission line and associated facilities; transmission towers; conductors; access roads to transmission line structures for construction and maintenance; substations; and materials and other utilities. At the environmental and social level, the project intervention area crosses a number of villages and some urban centres that contain community and economic structures as well as protected areas. The main environmental problems of the project are:

i) The relocation of populations and displacement of private or public socioeconomic structures;
ii) Clearing of the total land requirement and limitation of the forest cover along the connection corridors;
iii) Construction of pylons that exposes the soil to erosion;
iv) Temporary nuisance during the construction phase (noise, solid and liquid wastes, air and water pollution, and destruction of protected species);
v) The proposed line will pass through three forest reserves (Nyang'oro FR in lot1, Choda FR in lot 2 and Sekenke-Tulya FR in lot 3).and the proposed line will go through two flood plain recommended as a Ramsar site by Bird Life International at Wembere and Singida.
vi) Exposing neighbouring communities to STD/AIDS and hazards.

B7.1.2 Project Environmental Benefits

B8.1.2.1 With the interconnection line in place, it is envisaged that a power market exchange will be created and that this will ultimately lead to low cost of power supply. In addition, systems' stability, security of supply and optimization in the use of energy resources will be achieved. Also many people's livelihoods along the transmission line will be improved through the rural electrification program which as stated in the agreement is a component of the project.

B7.1.3 Monitoring of the Major Environmental Benefits

B7.1.3.1 The monitoring of the major environmental benefits will be through:
The implementation of environmental and compensation/resettlement will be the responsibility of the contractors under the supervision of the Project Implementation Unit for Iringa-Shinyanga 400 kV Transmission Line Project. The Project Office has a dedicated Environmental Specialist who will liaise with the Environmental and Social Management Unit of TANESCO under the supervision of the Senior Manager, Strategic Planning and Projects. Three dedicated environmentalists each for each section and two social scientists will be deployed to supervise and monitor ESMP implementation. It is acknowledged, however, that the Environmental Unit is in need of capacity building and institutional strengthening. Financial provisions have been made available by different DPs to support these requirements. With regard to ESMP monitoring, the Development Partners agreed on the joint monitoring of the ESMP and RAP implementation. Draft templates will be shared with TANESCO for consideration and once adopted, would form part of the social clauses in the contractor's contract. On its part, NEMC indicated that it will be expected to make surprise visits to inspect works, shall require annual progress reports, shall review responses by project proponent on queries raised by complainants from concerned public, ensure full compliance with key stakeholder (sector) regulations, and shall require an audit after the first year of operation.

B7.1.4 Sustainable Improvement in the Livelihood of the Disadvantaged

B7.1.4.1 The ESIA studies highlighted the issue of supplying power to communities affected by the project and those living in the project zone of influence. The program of rural electrification is generally underway in Tanzania coordinated by the Rural Electrification Agency (REA). Some of the Development Partners are already supporting this program and

provisions have been made in the design of this project to finance the shield wire which will facilitate implementation of the rural electrification program for the populations living in the project area.

B7.1.4.2 The most disadvantaged populations will thereby benefit from services that were hitherto unavailable such as: access to essential health care (vaccination and night maternity services) for pregnant mothers and young children; access to safe water in the areas served through pumps and lighting of primary and secondary schools and universities. Access to electricity will enable families to gain better access to administrative, communication and information services. Electrification will also enable the setting up of agro-food processing units that would help enhance the value-added of agricultural commodities by small farmers. These units will use unskilled labour made up of women and out-of-school youth.

B7.2 Stakeholders

B7.2.1 Extensive stakeholder consultations were undertaken with major stakeholders to ensure that most of the issues concerning the proposed project have been covered. Consulted were various stakeholders in relevant ministries and sectors in Dar es Salaam, Regions, Districts, various institutions including NGOs/CBOs operating at district levels and all villages where the 400 kV line is to pass. Awareness campaigns and participatory assessments such as discussions with local leaders, public village meetings, meetings and interviews with focus groups and various officials from public and private offices were held. Project affected villagers have also been visited to collect their views and concerns.

B7.2.2 At national level (Dar es Salaam), consultations were held with various stakeholders at ministerial and Government Agencies to obtain views at policy level. These included the Ministry of Natural Resources and Tourism, Ministry of Agriculture and Food Security and the Ministry of Lands and Human Settlements, Antiquities, TANROADS and TANESCO. Other stakeholders consulted in Dar es Salaam at this level included various mining development companies.

B7.2.3 To a larger extent, results of the consultations have been incorporated into the project design. Issues raised included land acquisition procedures, compensation in terms of valuation and timeliness for buildings and crops, the prospect of increased spread of HIV/AIDS and possibility of connecting villages along the line, among other issues. Although villagers are concerned about losing their properties, especially houses and farmland, they also revealed their willingness to re-allocate as they consider this project as very important for the Nation. Discussions with relevant District Land officers indicated that within the districts it is still possible to relocate project affected people as there are other villages with sufficient and not occupied or cultivated land.

B7.3 Gender analysis

B7.3.1 Although the project preparation did not necessarily carry out gender analysis, it is recognized that Gender roles involve unequal burdens of work distribution, resources, benefits and unequal decision making power- leading to gender gaps, disparities or inequalities. The

Tanzania's vision (2025) Focus is to attain human development and achieve a fully developed economy. The vision has been operationalized through MKUKUTA , that has addressed gender in the key outcomes areas and targets. The Government revised the Women Development Policy 1992 to a Gender Policy in 2000 mandated the Ministry of Community Development Gender and Children (MCDGC) for overall national coordination of gender issues in the country, including development of Strategic Plan on Gender by the MCDGC (2006). It is, therefore, the onus of TANESCO to ensure that these values trickle down to the project areas.

B7.3.2 The project design and its implementation per se do not have negative impacts that affect one gender group more than the other. Having said that, though, the risk of contracting HIV/AIDS is higher among women and girls is higher than men. This is because most men who will work in campsites may not come with their families and are most likely going to lure girls and women into sexual relationships using cash as the incentive. The national average prevalence rates are higher among women at 6.8% compared to 4.7% among men. The project area is bordering Iringa region which has the highest HIV/AIDS prevalence rate in Tanzania, 13.7%. The national prevalence rate among the sexually active population is reported to be 5.8 %, with females having a slightly higher rate (6.8%) than males (4.7%). The interaction between the young men employees and girls living in the project area may result in disproportionate spread of HIV/AIDS among women, and invariably exacerbate the situation. This will be mitigated through intensified campaign of HIV/AIDS awareness and prevention.

B7.3.3 Although the project will endeavor to offer equal opportunities for employment during implementation, it is still true to say that women often get discriminated against when hiring labor mostly due to the existing socio-cultural traditions and expectations, limited economic opportunities, and the dynamics that dictate gender relations in their communities. Gendered assumptions, however, contribute to a process whereby most women are allocated low paying, unskilled or lesser skilled work in both the formal and the informal sectors of the money economy. The terms upon which women and men compete for employment are set by wider social relations, including cultural, economic and political arenas. These include the assumption that a woman's primary commitment is to care for a family at home, in the 'reproductive' sphere of life; and that each woman depends on a male provider for cash needs. The skills label itself is usually arbitrary, and culturally defined. Skills associated with women tend to be undervalued, and defined as unskilled, even when they entail complex actions and thought processes, such as child care, subsistence farming, agro-processing and the like. That is the reason why the project proponent is being urged to take additional steps to ensure that women just like men are equally treated and given the opportunities available.

B7.3.4 Furthermore, the social survey has shown that most of the buildings in the area are of mud, poles and thatch. In situations of resettlement, construction of such buildings tend to pause a disproportionate burden on women who will be expected to provide building materials such as water, mud and grass on top of the usual domestic chores that women are expected to perform. The destruction of houses and need to replace will depend on the type of house to be re-built. Often poles and mud houses, representing 46%, in the area pause a burden on the women who have to collect water and prepare mud for building the houses. This may be mitigated by the project providing adequate compensation will enable the households to construct better types of houses and also to enable them hire labour which would assist in building the new homes.

B7.3.5 The project, on the other hand has potential benefits that will accrue to both men and women. Through the rural electrification, access to electricity will improve and allow households to us electricity for lighting. This will help women who often have to take responsibility of ensuring that there is light in the homes to enable them prepare food for the families and put children to sleep. School going girls will have the opportunity of doing school work after they have completed assisting mothers with domestic chores. Approximately 57.2% of households use kerosene as an energy source and 23.6% fuel wood. Women who have to prepare food for household and take care of children at night feel obliged to ensure readily available means of lighting.

B7.4 Social analysis

B7.4.1 ***HIV/AIDS and Other STIs.*** Tanzania is facing a 'generalized' epidemic of HIV. The national HIV prevalence rate among the sexually active population (defined as the population between 15 and 49 years of age) is reported to be 5.8 %, with females having a slightly higher rate (6.8%) than males (4.7%). The danger of HIV/IDS and other sexually transmitted diseases (STIs) during implementation of the project is relatively high considering the potential influx of workers recruited for the construction of the transmission line and people looking for work. Often these people are young men who may not be accompanied by their families given the nature and practice of these types of jobs. Although these camp workers will create the new social situation for a short period of time in the project area before they move away for the next section of the line, they never-the-less will have increased the risk for an accelerated spread of the epidemic. Experience has shown that work force influx has often increased the problem of HIV/AIDS, as single men earning money and local girls struggling for their livelihood will be a risky combination. Even if these contacts between external workers and local people are of temporary character (some weeks) they may lead to permanent impacts as increased HIV/AIDS rates or children born out of these brief social relationships. The magnitude of this increased risk will depend on the number of people that migrate into the project area and also considering that Iringa has the highest rate in the country standing at 13.7%.

B7.4.2 ***Mitigation Measures for HIV in collaboration with District Officials.*** Just like many countries, Tanzania has prioritized the fight against HIV/AIDS through various interventions. Transmission of infection is preventable through many changes among which are individual behaviors; hence education and information on HIV/AIDS, behavioral change communication as well as prevention strategies are necessary for people and communities to have the necessary awareness and courage to bring about changes in behavior at the community and individual levels. This will be one of the measures taken during implementation of this project. In addition will be distribution of condoms, peer education, and capacity building for local NGOs and CBOs. Consistent with the national interventions, the project will involve health authorities, NGOs, TANESCO and the contractor. Interventions shall include testing all workers periodically on HIV/AIDS; concentrate awareness and information campaigns on the group of workers; continue to sensitize workers and local communities on HIV/AIDS pathways; establish and support voluntary counseling and testing centers for HIV/AIDS; information materials on HIV/AIDS being posted at all work sites and villages along the way-leave.

B7.4.3 ***The Benefits on poverty-employment creation.***

B7.4.3.1 The major economic activities in the affected districts are farming and livestock keeping. Other activities include fishing, beekeeping, small-scale mining and small businesses. Small-scale farmers constitute 40% of the economic activities, pastoralists 20%, agro-pastoralists 30% and mixed farmers 10%. Both food and cash crops are grown at different scales. There is very little variation in the type of crops grown in most parts of the project area. With exceptions of cotton that is mostly grown in Igunga and Kishapu as the main cash crops, other districts of Singida, Dodoma and Iringa region grow sunflower and maize as their main cash crop. Food crops include maize, sorghum, millets, paddy, beans, cassava and sweet potatoes. Other cash crops grown in the project area include groundnuts, finger millet, yellow peas, coriander, onions and simsim. It is clear that the populations are sensitive to variations in their crop production. TANESCO and the contractor are, therefore, encouraged to schedule the construction of the transmission line in such a way that they allow those households with standing crops along the transmission line corridor to harvest their crops. This measure will reduce the negative impacts of the construction on the food supplies and income opportunities of the PAPs.

B7.4.3.2 Very few of the heads of surveyed households (< 10%) reported having a wage-paying job. As well, neither the spouses of the heads of the surveyed households nor other members of the surveyed households reported having wage paying jobs. Incomes per households also differ markedly between districts with Kishapu getting the highest from amongst the districts in the way-leave. The table below shows an average household income in a selected number of districts:

Table 9: Annual household income by district

No.	District	Av. Annual HH Income (TSh)
1.	Dodoma Rural	950,000
2.	Dodoma Urban	750,000
3.	Bahi	700,000
4.	Manyoni	500,000
5.	Singida Rural	1,050,000
6.	Singida Urban	1,400,000

B7.4.3.3 With these levels of income, creation of employment opportunities through the project both during construction and operation will augment, though to a limited extent, household incomes. During operation of the line, labor opportunities will in particular be related to the maintenance of the way-leave. These opportunities should benefit the local communities along the transmission line route. TANESCO, being responsible for maintaining the way-leave will be encouraged to use local labor for these tasks. The project will engage local people living in the neighborhood of the project area to work as casual laborers. The entire project is expected to recruit at least 1750 people who will be accommodated in 7 camps. The line section between Dodoma and Singida is expected to have at least two camps with approximately 500 workers. The net income per month per worker may be assessed at 150.000 TSh. Assuming that about 50% hereof will be spent locally, and taken into account the regional income level per household, the income level in the project area as a whole will be raised by 1% for two years.

B7.4.4 ***Potential for Accidents During Project Implementation.*** With some exceptions the transmission line will run not far from the Principle Main Road Iringa- Dodoma-Singida-Shinyanga (T 5/T3), which already today has a remarkable traffic volume of heavy trucks. The additional traffic induced by construction works may be assessed at 50 - 100 movements per day raising the existing traffic volume by a few percent only. The risk of traffic accidents may be assessed (due to experiences from similar projects in Eastern Africa) being 2 to 5 accidents per year. Working accidents may be assessed (by experience again) at 5 accidents per year per 100 km of transmission line, generally affecting workers employed in the line construction and very rarely people from the population around the construction site. Issues of concern associated with construction work include traffic accidents, however, the rate of traffic on the access road for construction vehicles and personal cars may be estimated to be around 50 movements per day, with a concentration during peaks in the morning and in the evening times, for a time span of about 3 weeks to 2 months. With these estimates, it is possible that fewer accidents averaging about 2.5 per year may be recorded and about 5 accidents per year associated with the work itself. The project implementation has put in place measures to ensure that movement of vehicles for the purpose of the transmission line and movement of employees does not result in increasing the potential for accidents. Measures shall include clear signs indicating heavy vehicles loading and off-loading materials; slow-down and stop signs when work is in progress especially during stringing; and ensuring that vehicles that carry employees abide by all traffic rules and regulations. Much more importantly, contractor will be obliged to fully comply with national as well as international Health & Safety regulations.

B7.4.5 ***Health and Safety.*** Health and safety issues for construction workers always an issue requiring particular attention. During implementation of this project, the contractor shall be obliged to apply the best practices regarding health and safety for the workers and population in the project area. The following are some of the matters to consider:

(i) Potentially dangerous construction sites shall be fenced off and guarded so that people are prevented from entering.
(ii) Provision of safety gear and equipment to the workers such as helmets, gloves, protective boots.
(iii) Warning signs shall be put up around the construction sites.
(iv) Moisturize open surfaces when and where high dust emissions are observed.
(v) Select sites for work camps (for storage and handling of materials as well as for workers accommodation) in close cooperation with the villages and district authorities.
(vi) Accommodation camps shall have a reliable supply of safe drinking water as well as proper sanitary facilities such as latrines and showers, look for alternative sources of water in areas that have no water or limited water.
(vii) Establish mobile hospital services that can be used by the workers while on site.
(viii) A proper first aid and referral system shall be set up to stabilize patients and transport them to a good standard hospital.
(ix) Periodic medical examination should be performed on all workers.

B7.4.6 ***Mitigation for Occupational Health and Safety.*** In order to ensure that health and safety issues are not left to chance, the following mitigation measures will be implemented:

1. Apply the best practices regarding health and safety for workers and population
2. Potentially dangerous construction sites shall be fenced off and guarded
3. Provide safety gears as helmets, gloves, protective boots, goggles and hearing protection
4. Warning signs shall be put up around the construction sites
5. Moisturize open surfaces when and where high dust emissions are observed
6. Select sites for work camps in close cooperation with villages and district authorities
7. Camps shall have reliable supply of safe drinking water and proper sanitary facilities; look for alternative water sources in areas with limited water
8. Establish mobile hospital services open for workers on site
9. First aid and referral system to stabilize patients and transport them to hospital
10. Periodic medical examination for all workers
11. Training of drivers to careful driving behavior
12. Preparation of a Health, Safety, Environmental and Social Plan for approval by TANESCO
13. Provide + share social services with communities TANESCO open
14. Raise payments to local people for provision of security services TANESCO open
15. Districts shall improve existing social services in villages with work camps

B7.4.7 Environmental and Social Monitoring Plan.

B7.4.7.1 Monitoring arrangements will be put in place to fulfill the requirements of the Government of Tanzania's and Development Partners' policies and guidelines. The objective would be to ensure that the PAPs and communities are adequately handled and are left in the same or better conditions than they were prior to project implementation. Both internally and externally monitoring and evaluation (M&E) will be carried out during compensation and implementation of the RAP. The M&E is also being recommended after resettlement has been concluded in order to assess the medium and long-term effects of the resettlement. The M&E of resettlement in linear projects like this, present practical and logistical challenges, since the resettled population is widely dispersed along the transmission line. In case of this project, additional mechanisms will have to be put in place to implement monitoring of resettlement plan along 670 km, in 5 administrative regions, 13 districts and 93 villages.

B7.4.7.2 Overall, TANESCO and the contractor will have the main responsibility for monitoring during the construction phase, whereas District Councils with District Medical Officers, District Natural Resources Officers and District Planning Officers will coordinate and cooperate closely to enforce compliance of the developer/contractor with the mitigation measures proposed. NEMC will have overall monitoring responsibility as part of the EMA implementation. In order to ensure that the resettlement and compensation activities are implemented successfully and that the PAP are treated equitably/fairly, an internal monitoring system will be defined and implemented by TANESCO in close collaboration with the implementing partners/agencies. This will provide the necessary monitoring data in an efficient and reliable manner. Monitoring will track:

(i) The progress of resettlement implementation.
(ii) The compensation payment process; and
(iii) Grievances made and resolved.

B7.4.7.3 TANESCO will produce periodic monitoring reports regarding the implementation of resettlement and mitigation activities. In order to assure an objective monitoring of the implementation of resettlement and compensation, monitoring shall be performed by independent individuals or organizations, which will use the internal monitoring data and other information provided by TANESCO. A monitoring body shall be established at district level for all affected districts to carry out external monitoring of resettlement and compensation processes. Monitoring and reporting by this body should be carried out at regular intervals, tentatively every third or fourth month. These reports should go to the district executive directors and be shared and discussed with the RMU and the Regional Commissioner. The Ministry of Land and Human Settlements Development shall conduct external monitoring of the resettlement and compensation process. It is anticipated that TANESCO, NEMC, the Ministry of Lands, Housing and Human Settlements Development, and the district authorities will jointly carry out the monitoring.