Document of
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Report No: 62070-MW

PROJECT APPRAISAL DOCUMENT

FOR A PROPOSED GRANT

IN THE AMOUNT OF SDR 40.4 MILLION
(US$ 65.4 MILLION EQUIVALENT)

AND A PROPOSED CREDIT

IN THE AMOUNT OF SDR 12.0 MILLION
(US$ 19.3 MILLION EQUIVALENT)

TO THE

REPUBLIC OF MALAWI

FOR THE

ENERGY SECTOR SUPPORT PROJECT

June 2, 2011

Energy Group
Sustainable Development Department
Country Department AFCS3
Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective April 30, 2011)

Currency Unit	=	US$
SDR 0.617	=	US$1
US$ 1.621	=	SDR 1

FISCAL YEAR
July 1 – June 30

ABBREVIATIONS AND ACRONYMS

AC	Alternating Current
BOT	Build Operate Transfer
BP	Bank Policy (World Bank Group)
CAS	Country Assistance Strategy
CFL	Compact Fluorescent Lamp
CPAR	Country Procurement Assessment Review
CPIA	Country Policy and Institutional Assessment
CSO	Civil Society Organisations
DA	Designated Account
DC	Direct Current
DFID	Department for International Development (UK)
DSM	Demand Side Management
EE	Energy Efficiency
EGC	Electricity Grid Code
EIB	European Investment Bank
EIRR	Economic Internal Rate of Return
EPC	Engineering-Procurement-Construction (contract)
ESAP	Environmental and Social Advisory Panel
ESCOM	Electricity Supply Corporation of Malawi
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental & Social Management Plan
ESMU	Environmental and Social Management Unit
ESPS	Energy Support Project Secretariat (in MoNREE)
FIRR	Financial Internal Rate of Return
FM	Financial Management
FPM	Financial Procedures Manual
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GNI	Gross National Income
GoM	Government of Malawi
HIPC	Highly Indebted Poor Country
HWG	Hot Water Geyser
IA	Implementing Agency

IBRD	International Bank for Reconstruction and Development
IC	Individual Consultant
ICB	International Competitive Bidding
IDA	International Development Association
IEG	Independent Evaluation Group
IFR	Interim Financial Report
IP	Implementation Progress
IPP	Independent Power Producer
ISDS	Integrated Safeguards Data Sheet
ISR	Implementation Status & Results Report
JICA	Japan International Cooperation Agency
km	Kilometer
kV	Kilo Volt
KVA	Kilo Volt Ampere
kW	Kilowatt
kWh	Kilowatt hour
LV	Low Voltage
M&E	Monitoring and Evaluation
MCC	Millennium Challenge Corporation
MDRI	Multi-Donor Debt Reduction Initiative
MERA	Malawi Energy Regulatory Authority
MK	Malawi Kwacha
MoNREE	Ministry of Natural Resources, Energy & Environment
MVA	Mega Volt Ampere
MW	Megawatt
MWh	Megawatt hour
NCB	National Competitive Bidding
NPV	Net Present Value
O&M	Operation and Maintenance
OP	Operational Policy (World Bank Group)
PAD	Project Appraisal Document
PDO	Project Development Objective
PIU	Project Implementation Unit
PMU	Project Management Unit
PP	Project Paper
PPA	Project Preparation Advance
PPP	Public Private Partnership
PS	Principal Secretary
PSC	Project Steering Committee
PSDMP	Power Sector Development Master Plan
PV	Photovoltaic
QBS	Quality Based Selection
QCBS	Quality and Cost Based Selection
RAP	Resettlement Action Plan
RE	Renewable Energy
RPF	Resettlement Policy Framework
S&I	Supply and Installation
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SAPP	Southern African Power Pool

SWG	Sector Working Group
SWH	Solar Water Heater
T&D	Transmission & Distribution
TEC	Technical Electricity Committee
TITK	Total Interruption Time per KVA Installed
ToR	Terms of Reference
TT	World Bank Task Team

Vice President:	Obiageli K. Ezekwesili
Acting Country Director:	Olivier P. Godron
Sector Director:	Jamal Saghir
Country Manager:	Sandra Bloemenkamp
Acting Sector Manager:	Anna M. Bjerde
Task Team Leader:	Rob Mills

PAD DATA SHEET

Republic of Malawi

Project Appraisal Document: Energy Sector Support Project

Africa Region
AFTEG

Date: June 2, 2011 Acting Country Director: Olivier Godron Acting Sector Manager: Anna Bjerde Project ID: P099626 Lending Instrument: Sector Investment Loan Team Leader(s): Rob Mills	Overall Risk Rating: Moderate Sectors: Power (100%) Themes: Access to Urban Services and Housing (50%); Infrastructure Services for Private Sector Development (50%) Environment Category: B (partial assessment)
Does this project include any CDD component?	○ Yes X No

Project Financing Data:

[ ] Loan [X] Credit	[X] Grant [ ] Guarantee	[ ] Other, explain:

For Loans/Credits/Others:
Total Project Cost (US$M): US$84.7 million
Cofinancing: N/A
Total Bank Financing (US$M): Grant: US$65.4 million; Credit: US$19.3 million; for a total of US$84.7 million

Proposed terms: Forty year maturity including a ten year grace period for IDA Credit.

Source	Total Amount (US$)
Implementing Agency (ESCOM)	0 million
IBRD	
IDA	
New	84.7 million
Recommitted	
Others	

Borrower: Government of Malawi

Implementing Agencies: Ministry of Natural Resources, Energy & Environment (MoNREE); Electricity Supply Corporation of Malawi (ESCOM)

Contact Person: Frank Kamanga, Chief Economist, MoNREE	Email: frankamanga@yahoo.com Telephone No. +265 1 203 125

Estimated Disbursements (Bank FY/US$ m)

FY	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Annual	**3**	**5**	**20**	**25**	**27**	**4.7**
Cumulative	**3**	**8**	**28**	**53**	**80**	**84.7**

Project Implementation Period: Five Years **Expected effectiveness date:** December 1, 2011 **Expected closing date:** October 30, 2016	
Does the project depart from the CAS in content or other significant respects?	○ **Yes** **X No**
If yes, please explain:	
Does the project require any exceptions from Bank policies? **Have these been approved/endorsed (as appropriate by Bank management?** **Is approval for any policy exception sought from the Board?**	○ **Yes** **X No** ○ **Yes** ○ **No** ○ **Yes** **X No**
If yes, please explain:	
Does the project meet the Regional criteria for readiness for implementation?	**X Yes** ○ **No**
If no, please explain:	
Project Development Objective: To increase the reliability and quality of electricity supply in the major load centers.	
Project description **Component 1: Electricity Network Strengthening & Expansion.** Rehabilitation, upgrade and expansion of priority parts of the existing distribution and transmission system, including extension of the network in selected peri-urban areas. **Component 2: Generation & Transmission Feasibility Studies.** Financing for feasibility studies (and associated environmental & social assessments) for development of new hydropower generation and transmission capacity required to meet Malawi's growing energy demand. **Component 3: Demand Side Management and Energy Efficiency Measures.** Financing for demand-side management (DSM) and energy efficiency activities in urban areas to help address Malawi's power capacity deficit. **Component 4: Capacity Building & Technical Assistance.** Financing for institutional strengthening and technical assistance to both MoNREE and ESCOM to support their efforts to further develop Malawi's energy sector. In addition, a Project Preparation Advance has been established to finance necessary preparatory studies and equipment, including the installation of meters in a large sample of substations.	

Safeguard policies triggered?	
Environmental Assessment (OP/BP 4.01)	**X Yes ○ No**
Natural Habitats (OP/BP 4.04)	**○ Yes X No**
Forests (OP/BP 4.36)	**○ Yes X No**
Pest Management (OP 4.09)	**○ Yes X No**
Physical Cultural Resources (OP/BP 4.11)	**X Yes ○ No**
Indigenous Peoples (OP/BP 4.10)	**○ Yes X No**
Involuntary Resettlement (OP/BP 4.12)	**X Yes ○ No**
Safety of Dams (OP/BP 4.37)	**○ Yes X No**
Projects on International Waterways (OP/BP 7.50)	**X Yes X No**
Projects in Disputed Areas (OP/BP 7.60)	**○ Yes X No**

Conditions and Legal Covenants:

Financing Agreement / Project Agreement Reference	**Description of Condition/Covenant**	**Date Due**
F.A. Article V, 5.01 (a) and (b); F.A. Article V, 5.02	**Effectiveness conditions:** • The Subsidiary Agreement has been executed on behalf of GOM and ESCOM • The Subsidiary Agreement has been duly authorized or ratified by GOM and ESCOM and is legally binding upon GoM and ESCOM in accordance with its terms. • GoM has adopted a Project Implementation Manual.	By Effectiveness
F.A. Schedule 2, Section IV, B.1.(b)	**Disbursement condition:** • No disbursement for compensation payments financed by IDA shall be made unless a RAP has been approved by the Association.	Before any provision of IDA financing for compensation payments
F.A. Schedule 2, Section II, B.1; P.A. Schedule, Section II, B.1	• GoM and ESCOM shall maintain or cause to be maintained a financial management system in accordance with the provisions of Section 4.09 of the General Conditions.	Ongoing covenant
F.A. Schedule 2, Section II, B.3;	• GoM shall have the project's Financial Statements audited, covering all project components. Each audit of the Financial Statements shall cover the period of one fiscal year of GoM. The audited Financial Statements for each such period shall be furnished to the Association not later than six months after the end of such period.	Ongoing covenant

F.A. Schedule 2, Section II, B.2;	• GoM will prepare and furnish to the Association not later than forty five (45) days after the end of each calendar quarter, interim unaudited financial reports for the Project covering the quarter and covering all project components, in form and substance satisfactory to the Association.	Ongoing covenant
P.A. Schedule, Section II, B.2	• ESCOM shall have its corporate financial statements audited by independent auditors acceptable to the Association, in accordance with consistently applied auditing standards acceptable to the Association. Each audit of these financial statements shall cover the period of one fiscal year of ESCOM. ESCOM shall ensure that the audited financial statements for each period shall be: (a) furnished to GoM and the Association not later than six months after the end of the period; and (b) made publicly available in a timely fashion and in a manner acceptable to the Association.	Ongoing covenant
P.A. Schedule, Section IV, A.1	• ESCOM will maintain a ratio of total operating revenues to total operating expenses of not less than 1.0	Ongoing covenant
P.A. Schedule, Section IV, A.2	• ESCOM will maintain a ratio of current assets to current liabilities of not less than 1.0	Ongoing covenant
P.A. Schedule, Section IV, A.3	• ESCOM will ensure that the estimated free cash flows from its operating activities shall be at least 1.0 times the estimated maximum debt service requirements for any such Fiscal Year on all its debt.[1]	Ongoing covenant

[1] Precise definitions of these terms are provided in the Project Agreement.

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I. Strategic Context

A. Country Context

1. **Malawi has a headcount poverty incidence rate of 40%.**[2] The country ranks at 153 out of 177 countries in the latest United Nations Human Development Index, with an estimated GNI per capita of US$280.[3] It is one of Africa's most densely populated countries, with a population of 15.3 million as of 2009. The population is young and growing: the average age is just 18 years and young people comprise 52% of the total. The population is expected to reach 22.4 million by 2025[4]. The country is landlocked, with a territory encompassing 118,484 km^2

2. **Malawi's economic performance has improved on most measures over the past five years.** For many years, the Government of Malawi (GoM) faced fiscal discipline challenges, eventually leading to an economic crisis prior to 2004, when domestic debt had reached 24% of GDP. In 2004, Malawi implemented a strong stabilization policy, and obtained debt relief from the Heavily Indebted Poor Countries (HIPC) initiative, which helped bring about a rapid turnaround in government finances, improved management of public spending and created the fiscal setting needed for the resumption of growth. As a result, real GDP growth has averaged about 7 percent in the last five years. The economy is predominately agricultural with about 80% of the population living in rural areas. In 2009, Malawi experienced some setbacks, including a general shortage of foreign exchange, which damaged its ability to pay for imports, and investment fell by 23%. Although several improvements are noted, there are still impediments to sustainable long-term growth such as unreliable power, water shortages, poor telecommunications infrastructure, and high costs of services.

B. Sectoral and Institutional Context

Electricity Sector Overview

3. The country has a total installed hydropower capacity of 283 MW, although units are frequently taken out of service for repairs. Malawi generates 98% of this grid-supplied electrical power through six run-of-river hydropower projects on the Shire River. The Electricity Supply Corporation of Malawi (ESCOM) is a vertically-integrated, Government-owned electric utility that generates, transmits and distributes electric power, to about 203,000 customers. ESCOM owns and operates all of the formal generation capacity in the country. Only about 8% of the population has access to electricity, mostly in urban centers. For the 80% of the people living in rural areas, access to electricity is less than 1%. Peak demand in Malawi is currently estimated at about 330 MW and demand is expected to grow at about 5 percent annually over the next decade. Currently, electricity supply cannot meet demand and new capacity is urgently needed in the generation system. To meet both currently suppressed demand as well as project future demand, Malawi would need to have in place by 2015 an estimated additional 140 MW of available capacity. Load shedding is a regular day-to-day occurrence for all but priority customers of ESCOM, and is estimated to frequently

[2] Welfare Monitoring Survey 2007
[3] World Bank – The Little Data Book 2010
[4] World Bank: "Malawi Poverty and Vulnerability Assessment, Investing in Our Future." June 2006.

exceed 35MW, or over 10% of peak demand. In addition, the currently operating power stations urgently need rehabilitation.

4. Due to the highly undiversified sources of power, Malawi faces significant hydrological risks. The fact that 98% of ESCOM's generating capacity power production is dependent on the flow of the Shire and the level in Lake Malawi renders Malawi very vulnerable to fluctuations in rainfall patterns.

Transmission and Distribution

5. ESCOM also operates the national electricity grid. The transmission network comprises 1250 km of wood pole lines and 815 km of steel tower lines. These lines transmit bulk power at 66kV and 132kV, and feed power to over 70 transformers which are located at 39 substations in the country.

6. In 2000-1, ESCOM was functionally restructured into three business units, namely Generation, Transmission and Distribution. Under Distribution, there were three geographical regions: Southern Electricity Supply, Central Electricity Supply and Northern Electricity Supply. Given the southern region's relatively higher level of industrialization and population, 60 per cent of the power distributed by ESCOM is supplied to consumers in this region. The transmission network supplying northern Malawi is extremely weak and insecure, posing a major constraint on the economic development of the area, where significant mineral deposits (including uranium ore) are available for exploitation.

7. ESCOM's transmission network has suffered from many years of under-investment and the system is, as a result, mostly old and outdated. Maintenance is well below international standards because of a lack of spare parts and skill sets of utility employees. The system is characterized by heavily loaded transmission lines and transformers, resulting in frequent failures especially during the rainy season, and generally poor quality and unreliable supply. The network configuration is based on radial feeders, which are inflexible and susceptible to outages. At the same time, due to the growing economy, the demand for electricity has risen over the past few years without corresponding investments in systems. As a result, overloading and bottlenecks are hence evident in many parts of the transmission system. During peak periods, load has to be shed to avoid dangerous overloads on lines and transformers, which would otherwise result in voltage collapse or even equipment failure. Overall, the existing system is greatly strained and the frequency of both scheduled and unscheduled blackouts/brownouts is increasing, constraining industrial production and provision of socioeconomic services.

8. Most of the low-voltage distribution networks supplying the main load centres are heavily overloaded, are operating beyond their design limits and extend beyond regulatory voltage requirements, thereby affecting quality and reliability of supply. Transformers and LV lines are oversaturated and over-extended, resulting in localized loss of power and contributing to high technical losses and excessive voltage drops. In some cases, single phase LV lines extend over a kilometre, causing high losses and phase imbalances on the networks. The LV distribution networks are also affected by a number of low voltage faults caused by various factors, including broken

'jumpers' and blown fuses. A fault analysis study for the period 2008/2009 revealed a high number of faults and excessive system restoration times, resulting in frequent and prolonged unplanned outages in customer service and power supply interruptions.

9. Given ESCOM's significant resource constraints, maintenance of the distribution system has often been on an emergency repair basis, with limited systematic rehabilitation, rendering the entire distribution system highly unreliable. Supply interruptions due to network inadequacies are perhaps a greater concern to the existing industrial and commercial operators than outages due to load shedding. Although ESCOM strives to maintain supplies to these priority MV customers, it is often unable to prevent outages due to equipment failures in the transmission and distribution systems.

10. Furthermore, ESCOM has a significant backlog of new connections, both from residential and industrial customers (including mining customers), resulting in significant suppressed demand in the system. The generation capacity deficit, the dilapidated condition of the distribution network and ESCOM's severe cashflow constraints together mean that ESCOM is severely limited in the number of new connections that can be made.

Legal and Regulatory Framework

11. The Government of Malawi has developed a number of strategies in the energy sector, including power sector reform, rural electrification, biomass energy and renewable energy. The Power Sector Reform Strategy (PSRS) approved by the Government of Malawi in 2003, provided for the unbundling of ESCOM and private sector participation via long term concessions in transmission and distribution and entry of Independent Power Producers (IPPs) for new generation capacity.

12. Consistent with these strategies, a set of legislation was approved by Parliament in 2004, including the Energy Regulation Act, an Electricity Act, a Liquid Fuels and Gas Act, and a Rural Electrification Act. However, the legislation was not gazetted until December 2007, with some items of the Electricity Act "captioned" (that is, did not enter into effect). These delays were due to changes in policy direction by the Government regarding unbundling of the power sector – namely an assessment that the power system is too small for ESCOM to be unbundled and concessioned-out. As part of the development of this project, the Government of Malawi has prepared a 'Letter of Intent' that sets out a program of energy sector reforms that it proposes to implement over the lifetime of the project. In particular, the Letter of Intent sets out how the Government intends to review the PSRS and clarify the framework for private investment in the energy sector in order to enhance the process of issuing licences to IPPs, with an initial target of at least one IPP licence issued by end-2012. As part of the reform process, Government has emphasised that it intends to clarify the electricity market structure and the role of ESCOM in the market (particularly the question of multiple licenses held by ESCOM) through a revision of the Electricity Laws by 2013. To this end, Government will put in place two enabling policy instruments: (i) a Feed-in-Tariff policy, to cover small hydro, biomass and wind resources and (ii) a Standard Power Purchase Agreement framework, to provide clear guidelines on the scope, duration and operational conditions of an IPP contract.

13. As part of the operationalisation of the 2004 energy sector legislation, the Malawi Energy Regulatory Authority (MERA) is now operational, and the predecessor energy sector regulatory bodies – the National Electricity Council and the Petroleum Control Commission – have been dissolved. A Board and small Secretariat is now in place. MERA's role includes inter alia (i) reviewing tariff applications from ESCOM and recommending tariff changes to GoM; (ii) granting

licenses for generation and distribution operators; (iii) arbitrating commercial disputes that arise under the 2004 energy legislation.

ESCOM'S Financial Vulnerability

14. Despite being a hydro-based system with zero fuel costs, ESCOM has had a weak financial situation and poor commercial performance over many years, with negative operating cash flow generation over several years, and combined transmission and distribution losses of over 22%. ESCOM, in consultation with GoM, is currently implementing a Financial Sustainability Plan, financed by a PPIAF grant, which includes activities to improve operational efficiency. Successful implementation of the plan will be a key factor in ESCOM's ability to improve its cashflow and financial position. The GoM has identified other key actions to restore ESCOM's financial health, including balance sheet restructuring. In August 2010, the Government announced plans to write-off or convert ESCOM's government debt, although the amount has not yet been confirmed.

Tariffs & Private Sector Participation

15. Tariffs are currently based on the replacement cost of the existing infrastructure. Given the age and inadequacy of the asset base, the average tariff had for a number of years remained under 4 US cents/kWh, a low tariff level by sub-Saharan Africa standards, and barely sufficient to meet ESCOM's operating costs for the existing power plants. Any major maintenance, repair, or rehabilitation works put huge strains on ESCOM's financial situation. At that tariff level, generation expansion was impossible for ESCOM without extensive external financing.

16. Industrial and commercial tariffs were slightly higher than those for the residential sector. Since it is less costly to supply HV industrial customers than LV households customers, there is a large cross-subsidy of residential customers by industry.

17. These low electricity tariffs together with the uncertainties associated with the implementation of the energy and electricity laws have been limiting factors for new investment in Malawi's electricity sector. Given ESCOM's poor financial condition, large generation investments would have needed access to private financing. However this is a challenge exacerbated by ESCOM's lack of creditworthiness, contributing to a lack of private sector participation in the sector.

18. In November 2009, MERA approved a 56.2 percent increase in electricity tariffs to cover four years between 2010 and 2013; the increase was implemented in two stages with a 36.0 percent increase taking place in December 2009, with the second tranche of 20.2 percent (relative to the electricity tariff levels prevailing at the time, which effectively translated into a cumulative tariff increase of 61 percent) implemented in January 2011. In 2009, a time-of-use tariff was introduced as well for business and industrial customers on three-phase supply. As described in the financial analysis section below, the impacts of this increase can be observed from the improvements in company's financial position and future projections. Keeping firm control of costs, reducing loss rates and improving commercial collections are critical factors to consolidate this nascent improvement.

Rural Electrification

19. Malawi's Rural Electrification Programme (MAREP) is being implemented by the GoM, with financial support from JICA. The goal of the program is to improve the rate of household

electrification through the extension of distribution. Phase V of this plan concluded in May 2007 and Phase VI is under implementation. The plan focuses on major trading centres, and Phase VI will electrify 108 trading centres. However, the rate of further expansion is somewhat constrained by the financial situation.

Biomass Usage

20. Malawi is heavily reliant on biomass for its cooking energy requirements, especially firewood and charcoal, which account for 95 per cent of national energy requirements for cooking. The current annual consumption of charcoal in the urban areas of Blantyre, Lilongwe, Mzuzu and Zomba is estimated at over 230,000 metric tonnes per year. This unsustainable level of biomass energy usage for household cooking is an increasingly critical development issue in Malawi. Growing demand for charcoal and woodfuel has been a primary factor in the widespread exhaustion of woodlots across Malawi, with notable 'hotspots' more than 100km in diameter around the main cities and in the Shire Valley. The impacts are multi-sectoral: deforestation is resulting in soil fertility degradation, erosion and river siltation, which in turn undermine subsistence livelihoods, increase flood risks and damage hydro-power infrastructure. The World Bank is addressing this issue via the proposed Shire River Basin Management project currently under preparation. This multi-sector project will seek to address the core causes of the degradation of the Shire river basin, via both supply and demand-side measures. The energy sector task team liaises closely with the Shire River Basin Management task team to ensure biomass energy issues are adequately addressed in that project.

Long-term Generation Potential

21. Given the structural capacity deficit, Malawi needs urgently to accelerate the development of new generation capacity. A screening analysis of new generation sites undertaken in the most recent system expansion studies identified various possible hydropower generation sites. Of these, Kapichira phase II has the lowest energy costs, and also performed well in sensitivity tests. Accordingly, GoM has committed to finance Kapichira II from its own budget, using the proceeds of the Rural Electrification Fund. As of April 2011, the contract had been signed, an advance payment made and contractor mobilisation is expected shortly. After Kapichira phase II, Lower Fufu (90-180 MW), Mpatamanga (100-150 MW) and Kholombidzo (160-370 MW) are each strong economic candidates for the next large hydro project. However, preliminary assessment of environmental and social impacts ruled out the Kholombidzo site, due to the high maximum water levels that would affect Lake Malawi and Liwonde National Park. The environmental impact of Mpatamanga was considered to be lower, but it provides no diversification away from the Shire River. As a result, Lower Fufu and associated transmission infrastructure is seen as the current best option for the next domestic generation capacity site, followed by Mpatamanga.

22. Full feasibility studies (including detailed environmental and social impact assessments) for these sites are an urgent first step in developing these sites, and this need is addressed in Component 2 of the proposed project.

Transmission and Distribution Network Upgrades

23. Given the potential load growth in the north of the country, from the uranium mining sector and other industrial consumers, ESCOM is aware that, even if they had the generation capacity available, the transmission link to the region is very weak and in need of major reinforcement. The

current link along the Lake Malawi shoreline is limited to 33kV transmission capacity in some places. A systematic strengthening of transmission capacity to the north is needed in order to provide security of supply for mining and other new industrial loads. The MCC Compact (see below) is providing financing for upgrades to the existing lakeshore transmission infrastructure. In the medium-term, construction of a new medium or high voltage "backbone" heading north from Lilongwe is needed, and this need is also addressed in Component 2 of the proposed WB-supported project.

Interconnection with the Southern African Power Pool

24. ESCOM is an 'unconnected' member of the Southern Africa Power Pool (SAPP) and it hence does not currently trade electricity through the SAPP or bilaterally with neighbouring countries.[5]

25. In July 2007, a Mozambique-Malawi Transmission Interconnection project was approved by the World Bank Board. This would have financed a 220kV interconnector from Mozambique to Malawi, running from the existing Matambo substation in the Tete region of northern Mozambique to a new substation at Phombeya, located north of Blantyre in Malawi. The line would have had a maximum operating capacity of approximately 300 MW.

26. The credit to Malawi for this project was never signed by the Government. Following communications from GoM that the top energy sector priority was to increase Malawi's own energy generation capacity, the Malawi credit for the Malawi-Mozambique Interconnector project has now been withdrawn. A notification letter to this effect was sent to the Minister of Finance on 8th July, 2010. The investments proposed below for this IDA-supported project are in line with the priorities communicated by GoM.

DSM and Energy Efficiency Activities

27. ESCOM is planning a program to replace 2 million traditional incandescent bulbs with low power CFLs (1.3 million to households and 0.7 million to businesses and other customers via a voucher system), over a period of 18 months, including the procurement period. It is estimated that the program will potentially shave up 20-30 MW of demand off the evening peak and deliver 100 GWh/year of energy savings. DFID will provide £2.6 million for the project – a much smaller investment than would be required to install the equivalent new generation capacity. The GoM has also removed the excise duty on CFLs while doubling the duty on incandescent bulbs.

28. A time-of-use tariff was introduced in 2009, demonstrating the Government's commitment to energy savings measures. Taking advantage of time-of-use tariffs do not require major investment by ESCOM, since many MV customers already have programmable digital meters that can cope with dynamic tariff structures.

Renewable Energy resources

29. Malawi presents considerable opportunities for renewable energy. Indigenous hydropower potential is under-exploited. There are good solar characteristics, although not as good as in South Africa, Botswana and Namibia. There is likely to be significant wind energy potential, though this

[5] The Malawi transmission grid does supply some LV power to settlements just over the Malawi border in neighbouring countries, where there is no coverage from the domestic grid.

has not yet been assessed to industry standards and this gap will be addressed by this project. Biomass potential (including biofuels such as ethanol) is considerable, although exploitation faces a number of challenges. In addition, Malawi's position along the Rift Valley suggests the possibility of geo-thermal resources, though no investigative work has yet been undertaken. This will also be addressed by this project. This renewable energy potential is set against indigenous coal reserves that are currently exploited on only an informal basis, and petroleum imports that carry a high transportation cost burden. As part of the work to develop the MCC Compact (see below), a desk-based "mapping" of renewable energy resources is currently being undertaken, focusing on wind, solar and mini-hydro resources. The need for further 'on the ground' technical assistance work to build on this mapping, in order to assess the feasibility of exploiting these renewable energy resources is addressed in Component 4 of the proposed project.

Other Development Partners

30. The Millennium Challenge Corporation (MCC) has signed a US$350 million Compact with GoM to provide support to the energy sector in Malawi. The Compact is expected to enter into force by Q3 CY11. The Compact will provide financing for a program of grid rehabilitation and upgrade, focused in the generation and transmission sub-sectors, as well as investments in natural resource management. As part of Compact preparation, MCC financed detailed feasibility studies, which identified urgent energy sector investments in Malawi with estimated costs of approximately US$475 million. These studies have been drawn on in the preparation of some activities in the World Bank financed project.[6] That said, the IDA financing supports a stand-alone project and is not part of any joint co-financing. Achieving the project's Development Objective and the expected results does not depend on implementation of, or progress in, the MCC Compact.

31. In addition, the MCC Compact will support a program of policy reforms, including improvements in the financial management, operational management and corporate governance of ESCOM, as well improvements in the regulatory framework for private sector participation in the sector. The World Bank task team has coordinated closely with the MCC project team during the development of the Compact, and the program of policy reforms reflects the assessments of the WB task team on key sector and regulatory issues. The program of policy reforms supported by MCC is consistent with the energy sector reforms set out in the 'Letter of Intent' prepared by the Government of Malawi, as described above.

C. Higher Level Objectives to which the Project Contributes

32. The proposed project contributes directly to the set of objectives set out in the Malawi Country Assistance Strategy (CAS) (FY07-FY11). The CAS is a program of country assistance in support of the overall MGDS, which underscores the importance of putting in place a foundation for long-term economic growth through improved infrastructure and the investment climate. It specifically proposes that the Bank continues to play a central role in infrastructure development, focusing its efforts in energy and water development.

33. The proposed Energy Sector Support Project, which encompasses: (i) rehabilitation, upgrading and expansion of existing electric transmission and distribution systems, (ii) funding of feasibility studies and preliminary design work for new hydropower plants and backbone

[6] The MCC Compact is also financing an update of the 1998 Malawi Power System Master Plan.

transmission line, (iii) demand side management and energy efficiency measures, and (iv) technical assistance and capacity-building for ESCOM and MoNREE, is directly associated with the CAS outcome of putting in place a foundation for long-term economic growth through improved infrastructure and the investment climate, by helping close the supply-demand gap and improve the electricity distribution and transmission sector.

34. A new CAS for the FY12-15 period is currently under preparation in consultation with GoM, and the energy sector remains a stated high priority. The draft CAS documents state that the World Bank will support the Government in addressing critical growth constraints, so as to help Malawi achieve a more sustainable, diversified and inclusive growth. High among the focus areas in the new CAS will be efforts to enhance economic productivity via investments in infrastructure, notably via improved energy supply.

35. In addition, the proposed project fits closely to the economic growth and development priorities objectives set out in the Government of Malawi's five-year Growth and Development Strategy (MGDS) (2006-2011). The MGDS identifies energy, along with five other key priority areas, as a crucial input for industrial processing. The GoM recognizes that the power sector is a key constraint to Malawi's economic growth. The objective of the MGDS with respect to energy is to reduce the number and duration of blackouts, increase access to reliable and affordable electricity in rural areas and other targeted areas, and improve coordination between the needs for energy for households and those of other high growth sectors such as tourism and mining. The revised MGDS, to be called MGDS2, maintains the current set of priorities.

36. Furthermore, the proposed project is aligned closely with the new Africa Strategy, namely the focus in the Strategy on addressing the continent's massive infrastructure deficit – particularly in the energy sector – as a means of enhancing Africa's competitiveness and employment levels.

II. Project Development Objectives

37. The Project Development Objective is to increase the reliability and quality of electricity supply in the major load centres.

1. Project Beneficiaries

38. In summary, the project will deliver the following investments and results:

- Financing for the rehabilitation, upgrade and expansion of the existing transmission and distribution network, focusing on priority sites where the most urgent works are required. The proposed investments will help address the extensive weaknesses in the grid summarised above, resulting in a reduction of technical losses and an increased quality and reliability of service (reduced frequency of electricity interruptions and improved voltage stability), to the benefit of grid-connected households and businesses in major urban areas in Lilongwe, Blantyre, Zomba and Mzuzu.
- Financing for feasibility studies for several potential hydropower sites over a range of capacities and geographical locations and a back bone transmission line. These studies are prerequisites for expansion of Malawi's installed generation capacity as well as for diversification of generation sources. The focus on renewable energy investments will contribute to the continuation of a low carbon development trajectory. These studies will pave the way for

expansion of electricity generating capacity in Malawi, which would ultimately address the loadshedding problems and enable electricity access expansion for a greater share of the Malawian population.

- Financing for demand side management (DSM) and energy efficiency measures with the aim of narrowing the supply-demand gap at relatively low cost in a relatively short timeframe. By reducing the scope and duration of power outages, this will benefit connected customers currently affected by the ongoing load-shedding program.

2. PDO Level Results Indicators

39. The anticipated PDO-level Results Indicators shall be:

- Reduction in electricity losses per year in the project areas [Core Indicator]
- Total Interruption Time per KVA Installed (TITK) per year in the project areas
- Direct project beneficiaries (number), of which female % [Core Indicator]

III. Project Description

A. Project Components

Component 1: Electricity Network Strengthening & Expansion (estimated at US$56.2 million, including contingencies).

40. This component includes the rehabilitation, upgrade and expansion of priority parts of the existing distribution and transmission system, including extension of the network in selected peri-urban areas and reinforcement of the LV reticulation. The component will be divided into three sub-components:

41. ***Component 1a: Distribution & Transmission Uprating and Expansion (estimated at US$41.9 million, including contingencies):*** Activities in this sub-component include: (a) Construction of four new substations and associated lines; (b) Uprating of five existing substations; (c) Construction of new 33kV & 11kV lines and installation of capacitor banks; (d) Rehabilitation of 33 kV lines; (e) Rehabilitation of underground cables; (f) Extension of the peri-urban network; (g) Acquisition of generation spare parts.

42. The substation investments are predominantly 'interface' substations between the 66 kV transmission system and the distribution system (i.e. with 11kV or 33kV as the secondary voltages).[7] Similarly, all the lines to be either built or rehabilitated are sub-transmission lines at either 33kV or 11kV. In line with the request received from the Government of Malawi, the proceeds of the IDA financing will be used for any cash compensation payments related to the installation of substations and distribution lines under this component. Annex 2 provides further details on the specific investments proposed.

43. ***Component 1b: Low Voltage Reticulation Reinforcement and Technical Implementation Support (estimated at US$10.5 million, including contingencies***): Activities in this sub-component cover the acquisition & installation of low-voltage reticulation goods and equipment, to include: (a)

[7] With the exception of one 132/66/33kV transformer and one new 'greenfield' 132/33kV substation.

reconfiguration and extension of medium voltage overhead lines (11kV and below) supplying distribution transformers (such as pole-mounted MV/LV step-down transformers), (b) installation of approximately 111 new distribution transformers, (c) construction of new three-phase low voltage overhead lines and conversion of single-phase to three-phase low voltage overhead lines, and (d) supply of associated maintenance & operation tools.

44. The sub-component will also provide support and training to ESCOM's technical services who will implement the activities directly, by enhancing ESCOM's existing Training School in Blantyre. This will be undertaken by a dedicated team of trainers from an international firm with experience in this type of training, to deliver a comprehensive, hands-on training program for ESCOM linesmen and other technicians in industry best practice in all aspects of LV reticulation reinforcement, including design principles of LV reticulation.

45. The nature of low voltage reticulation reinforcement activities is that they are undertaken at multiple sites in the cities, primarily in those areas that have the oldest network or have experienced the greatest load growth. The precise locations will be determined by ESCOM's services following detailed survey work during project implementation.

46. ***Component 1c: Design, Procurement & Supervision (estimated at US$3.8 million, including contingencies):*** In order to smoothly implement the project, ESCOM will procure a Consulting Engineering firm with international experience in design and construction of T&D projects. The Consulting Engineering firm would be recruited on the basis of a two-phase contract:

- **Preparation:**

- Preliminary survey and design work and technical specifications for T&D investments in Component 1a
- Preparation of the Bid Documents for Components 1a and 1b activities
- Support in all stages of the procurement process for the main contracts for Components 1a and 1b, including assisting ESCOM in contract negotiations and preparation of final contract documents

- **Implementation:**

- Support to ESCOM to supervise contractors during implementation of Component 1a, including on safeguards issues.
- Advise ESCOM on establishing a dedicated materials management system for the goods to be procured by ESCOM under Component 1b, to run alongside ESCOM's existing main system. The consultant would also carry out regular independent audits of the materials management system, on behalf of ESCOM management.
- Play an independent verification / 'due diligence' role in Component 1b, to provide assurance to ESCOM management and the WB that works are proceeding correctly.

47. In addition, the consultant will also provide support and training to ESCOM's technical services in a range of areas including: (a) technical guidance on 'technical loss audits', (b) revision of technical codes of practice and design/implementation manuals, (c) advice on materials and supply such as equipment standardisation to minimize overall business operation costs, and (d) guidance on development of utility reliability indices for measuring performance, among others.

Component 2: Generation & Transmission Feasibility and Design Studies (estimated at US$15.2 million, including contingencies).

48. This component includes financing for feasibility studies needed for eventual development of an additional 200–380 MW of new hydropower generation capacity in Malawi. The feasibility studies will include technical, engineering design & economic assessments and ESIAs (at either preliminary or full level, depending on the site), and development of the necessary environmental and social mitigation/management plans (again at either preliminary or full level, depending on the site).

49. The feasibility studies will include investigation of up to two sites with potential capacity of over 100MW on the major rivers in Malawi (Lower Fufu on the South Rukuru river and **Mpatamanga** on the Shire river), as well as one site with less than 50 MW potential capacity on a tributary river (**Chimgonda** on the Dwambazi River). The spread of the feasibility studies by size and geography will allow for a diversification of the sources of water for hydropower generation to mitigate some of the hydrologic risks of the already-crowded Shire river system. A full ESIA and Resettlement Action Plan (RAP) will only be prepared for the Lower Fufu Hydropower site.

50. The details of the various proposed sites are as follows:

- **Lower Fufu** is a high-head (over 300 m) run-of-the-river site with potential to utilize the South Rukuru River and, through a connector, the North Rumphi River flows, for a generation capacity range of 90 – 180MW. This site can make a major contribution to generation in the northern part of the country and, with reinforced evacuation capacity to the south, also to the rest of Malawi. The technical aspects will be carried out to the level of full project engineering design and will be accompanied by a comprehensive economic analysis. A full Environmental and Social Impact Assessment (ESIA), comprising independent environmental & social impact analyses and associated mitigation/management plan and the preparation of a Resettlement Action Plan (RAP), will be carried out by an independent consultant. The two studies will, however, be closely coordinated and be prepared in parallel. The objective will be to complete this technical study and the full ESIA and RAP to the point that the entire project is ready to move directly to the financing stage. Estimated study cost for this site, for both parts, is US$6.3 million, including contingencies.
- **Mpatamanga** is a medium head (50-60 m) storage site located on the Middle Shire River. The optimum capacity at this site is approximately 100-150 MW. The feasibility study at this site will consist of an integrated technical & economic assessment plus a preliminary ESIA. The technical aspects will be carried out to the level of preliminary project engineering design. The ESIA aspects will be carried out at the preliminary level, rather than full impact level. Also an estimate will be made of the number of Project Affected People (PAPs). Estimated study cost for this site is US$3.6 million, including contingencies.
- The smaller **Chimgonda site** on the Dwambazi River appears to be suitable for a feasibility study through this project. The capacity at this site is estimated at 20-50MW. As with the Mpatamanga site, the feasibility study will consists of an integrated technical & economic assessment plus a preliminary ESIA. Also an estimate will be made of the number of PAPs. The technical aspects will be carried out to the level of preliminary project engineering design and the ESIA at preliminary level. Estimated study cost for this site is US$2.4 million, including contingencies.

51. **Dam Safety Experts.** It is likely that the first phase of the Lower Fufu feasibility study will recommend construction of a diversion dam and intake structure as part of the design of the hydropower facility. Because there can be grave consequences if a dam does not function properly or fails, the World Bank takes dam safety concerns seriously and will always promote best practice in the design of new dams, as well as during all later stages of project development that might follow. To this end, in any second phase of detailed engineering design that covers dam design for Lower Fufu, it will be necessary to hire under the project a separate and independent expert (or group of experts) to review the quality of the studies and designs being undertaken by the main consultant, in order to guarantee that they reflect international best practice and standards with respect to dam safety. Similarly, with the Mpatamanga and Chimgonda sites, in the event that the part of the ToR that covers preliminary engineering design includes preliminary design of a dam, it will also be necessary to have independent review with regard to dam safety aspects of the project. The estimated cost for the independent expert (or group of experts) overseeing the quality of the three hydropower studies from a dam safety best practice perspective is US$0.3 million.

52. In addition, an Environmental and Social Advisory Panel (ESAP), consisting of one environmental expert and one resettlement expert, will be established to review the TOR, full ESIA, RAP and other safeguard documents and advise on safeguard aspects for the Lower Fufu Hydro Power Plant. The ESAP will also review and advise on the safeguard aspects of the two other proposed dam sites and the on the preliminary selection of the Right of Way for the Transmission Backbone. The cost for a two year contract for the ESAP is estimated at US$160,000.

53. The social and environmental assessments are expected to indicate that no major adverse social and environmental impacts would be expected from the eventual development of these sites. In addition, none of the sites selected for studies are located in nature reserves, protected areas or other areas of environmental sensitivity and high biodiversity.

54. Once the studies are completed and if proven feasible, the least-cost priority sequence of eventual development of the sites studied will be confirmed by the update of the Malawi power sector Master Plan that is currently underway.

55. **Transmission system**. Over the medium term, there is a need to further expand Malawi's transmission system. There is insufficient transmission capacity to evacuate power from the new generation sites in the north (e.g. from Lower Fufu, as discussed above) to the major load centres in the central and southern regions. In addition, the single lakeshore line currently in place implies a lack of redundancy in transmission capacity to and from the northern region. As a result, any unplanned outages or scheduled maintenance inevitably cuts off the northern region. It is proposed to finance a pre-feasibility study for a new 'inland' transmission backbone line that would run north from Lilongwe via Kasungu to Mzuzu on the western side of Malawi (approximately 350km), including the associated environmental and social impact studies at a preliminary level, including an estimate of the number of potential affected PAPs. Estimated cost of transmission backbone feasibility study: US$2.5 million, including contingencies.

Component 3: Demand Side Management and Energy Efficiency Measures (estimated at US$6.8 million, including contingencies)

56. Given the severe capacity constraints in Malawi's power system – evidenced by the extensive and year-round load-shedding program discussed above – it is proposed to finance several demand-side management (DSM) and energy efficiency activities, focusing on reducing the coincident peak

load and therefore reducing load-shedding. Some of those activities will also contribute to achieve energy savings. These interventions will provide, at relatively low cost, critical 'quick wins' in Malawi's efforts to close the demand-supply gap, pending the installation of new generation capacity in the medium term. They will also help Malawi manage its system more reliably and at a lower cost.

57. The proposed investments focus on Hot Water Geysers (HWGs), as water heating load accounts for a large fraction of household energy consumption. There are about 23,000 installed domestic electric water heaters rated from 1.5 kW to 4.5 kW. The activities will include:

- De-rating of Hot Water Geysers (HWGs) heating elements to a limit of 2.5kW via a free replacement program of existing elements to better distribute consumption to non-peak hours and therefore reduce coincident peak load;
- Installation of 'insulation blankets' via a free program to better insulate existing HWGs, hence reducing usage during peak hours and increasing energy efficiency;
- Wireless load control to manage HWG and other non essential loads during peak hours, allowing ESCOM to remotely switch-off HWGs in given areas at given times. Depending on its success, it could be considered in the future to extend this program to other household appliances, such as electric cookers.

58. A summary of those interventions and investment costs are shown in the following table.

Activity	**# Installations**	**Cost (US$ million), including contingencies.**
De-rating of HWG heater elements	11,250	0.8
Installation of HWG insulation 'blankets'	20,000	2.2
Wireless HWG load control	17,000	3.5
DSM Supervision Consultant		0.3

59. The total reduction in peak loads at any given time (in peak hours) from these investments (factoring in any double-counting) is estimated at 11 MW.

60. It is envisaged to finance a supervision consultant to assist ESCOM with inspection of and sign-off on the contractors' activities.

61. The proposed investments are in addition to the ongoing CFL program financed by DFID and developed in consultation with the World Bank. The investments would be rolled out over a period of 2-3 years.

Component 4: Capacity Building & Technical Assistance (estimated at US$3.5 million, including contingencies).

62. This component will provide institutional strengthening and technical assistance to both MoNREE and ESCOM to support their efforts to further develop Malawi's energy sector. Activities will include:

Component 4.A Support to ESCOM (estimated at US$0.6 million, including contingencies)

63. Activities in this sub-component will include:

- Provision of necessary software and equipment to support distribution planning and training, including software and hardware.
- A program of activities aimed at building the capacity of the Project Management Unit at ESCOM, including training in World Bank procurement, financial and disbursement procedures, World Bank environmental & social safeguards management, project management etc.
- Resources for effective management and supervision of the project, consisting of:
  - Incremental operating costs
  - Office equipment and hardware for the PMU
  - Necessary operational consultancy support for the PMU, including project audits, IT/systems maintenance and other short-term specialists.

Component 4.B Support to MoNREE (estimated at US$2.9 million, including contingencies)

- Specialized **technical assistance**, including studies to accelerate the exploitation of renewable energy resources in Malawi. Specifically, building on the renewable energy mapping work being financed by MCC (as discussed above), it is proposed to finance technical assistance for (i) a **wind power resource study,** using primary data from anemometers (and other hardware) to be installed at key sites, (ii) preliminary assessment of **geothermal** prospects, and (iii) a technical assessment of the opportunities to expand bagasse-fuelled **cogeneration capacity** from the significant sugar production operations in Malawi.
- Support for **sectoral studies** to underpin the evolving strategic agenda (energy policy and pricing, renewable energy development and regulatory issues, among others). This would, inter alia, cover technical assistance on measures necessary to strengthen the institutional, legislative, regulatory and safeguards frameworks for dam safety programs, as part of Government's forward planning for the development and operation of new hydropower plants in Malawi. In addition, support for public outreach campaigns on energy efficiency could be considered under this general rubric
- Support for specialist **IPP advisers** to provide financial, legal and technical advice to GoM and MERA as it begins to solicit private sector investment in the power sector, particularly to assist with negotiations on Independent Power Producer (IPP) projects
- A program of activities aimed at building the capacity of the ESPS at MoNREE, including training in World Bank procurement, financial and disbursement procedures, World Bank environmental & social safeguards management, project management, energy planning, economic and financial analysis, M&E systems etc. Training-related travel expenditures and other travel-related allowances would also be financed.
- Resources for effective management and supervision of the project, consisting of:
  - Incremental operating costs (described in more detail in Annex 2)
  - Equipment and hardware for the ESPS, including one utility type pick-up truck or mini-van/multi-person vehicle for team transport.
  - Necessary operational consultancy support for the ESPS, including project audits, IT/systems maintenance and other short-term specialists.

B. Project Financing

1. Lending Instrument

64. The lending instrument is a Specific Investment Loan (SIL) in an amount equivalent to US$84.7 million, allocated from the current IDA-15 envelope. The financing will be composed of an IDA credit of US$19.3 million equivalent and an IDA grant of US$65.4 million equivalent. It is proposed that the IDA credit be provided to ESCOM by the Government under standard IDA credit terms and conditions as part of the financing for Component 1 of the project, and that the relevant portion of the IDA grant be provided to ESCOM by the Government as a grant, also as part of the financing for Component 1 of the project.

2. Project Cost and Financing

65. The total project cost is estimated at US$84.7 million. IDA will be the only external source of financing at US$84.7 million equivalent. ESCOM will finance the implementation costs in Component 1b[8] (primarily LV reticulation installation labour costs). In line with the request received from the Government of Malawi, any cash compensation costs relating to crop damage, land acquisition, displacement or resettlement that may result from project activities in Component 1 will be financed from the proceeds of the IDA financing. A summary of project costs is given in the table below.

Project Cost Table (US$ million)

Project Cost by Component	Base Cost*	Contingencies**	Total
Component 1: Electricity Network Strengthening and Expansion***	52.91	3.25	56.16
1a: Distribution & Transmission Uprating and Expansion	39.90	2.00	41.90
1b: Low Voltage Reticulation Reinforcement	9.51	0.95	10.46
1c: Design, Procurement & Supervision	3.50	0.30	3.80
Component 2: Power Generation & Transmission Feasibility Studies	13.98	1.20	15.18
Component 3: Demand side Management (DSM) and Energy Efficiency Measures	6.17	0.61	6.78
Component 4: Capacity Building and Technical Assistance	3.26	0.28	3.54
4a: Support for ESCOM	0.58	0.05	0.63
4b: Support for MoNREE	2.68	0.23	2.91
Total	76.28	5.34	81.66
Project Preparation Advance	3.0		3.00
Total Project Cost			**84.7**

* Base Cost is inclusive of 15% withholding tax levied on consulting services fees.
** Contingencies consist of: 5% of Component 1a and 10% of all other components cost estimates.
*** Amounts in Component 1 are inclusive of budgeted compensation payments

[8] However, as these are expected to be recurrent salary costs of ESCOM, they are not considered incremental project costs.

IV. Implementation

A. Institutional and Implementation Arrangements

66. In 2010 the Government issued a directive under which all externally-supported projects would be implemented using country systems and existing PIUs would be discontinued beyond December 2011. Accordingly, the project implementation arrangements conform to the directive and have been designed to meet Government objectives of mainstreaming project implementation capacity in the beneficiary institutions and the World Bank's objectives of ensuring professional, accountable and timely project implementation.

67. The project will be overseen by a Project Steering Committee (PSC) comprising the Principal Secretaries (PSs) in the Energy sub-sector. The energy sub-sector falls under the Energy and Mines Sector in the sector working group (SWG) institutional set up and organisation of the Malawi Government. The SWG set-up has been developed to provide a forum for negotiations, policy dialogue and agreement of plans and undertakings amongst government, development partners, civil society organisations (CSOs) and private sector which affect or are affected by the sectoral activities. The Principal Secretary of Natural Resources, Energy and Environment (MoNREE) chairs the PSC whose other members are the PSs for Ministries of Irrigation & Water Development, Lands, Housing & Urban Development, Development Planning & International Cooperation and the Chief Executives and Financial Directors of ESCOM and MERA. Essentially, the PSC will provide strategic direction, inter-Ministerial coordination and policy guidance, oversee implementation of policy decisions, endorse consolidated annual work plans and budgets, and monitor progress. It will meet on a quarterly or semi-annual basis, as required.

68. A Technical Electricity Committee (TEC) has been established to provide technical direction to the project. Members of TEC are at Director level from relevant Ministries and Departments in the energy sub-sector. The Director of the Energy Affairs Department chairs the TEC. Other members are the Directors responsible for technical regulation at MERA, resettlements at Ministry of Lands, Housing & Urban Development, environmental and social safeguards at Environmental Affairs Department, and the appropriate Directors at ESCOM. The TEC is also formally responsible for preparing consolidated Annual Work Plans and budgets for review and approval by the PSC and for onward transmission to the World Bank. The TEC will meet regularly and frequently.

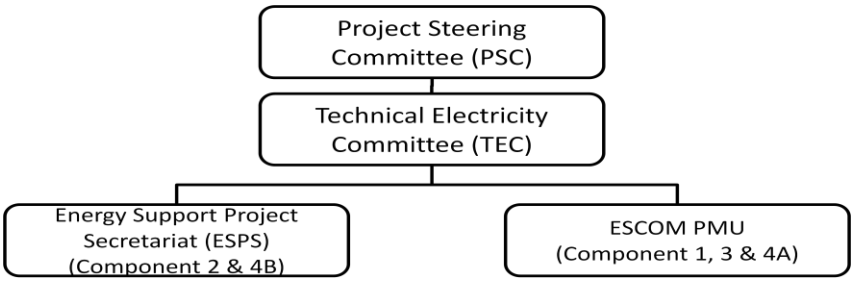
69. Day-to-day management of the project will be provided by the two implementing agencies. Component 2 (Generation and Transmission Feasibility Studies) and 4b (Capacity Building and Technical Assistance for MoNREE) of the project will be managed by an Energy Support Project Secretariat (ESPS) to comprise officers from MoNREE headquarters (including Policy and Planning to provide coordination services to the project, Procurement, Accounts and Audit), Energy Affairs Department and Environmental Affairs Department (particularly the Environmental and Social Safeguard Specialists), as well as a representative from Ministry of Finance. The ESPS will comprise the following officials and associated responsibilities:

- Project Coordinator & Deputy Project Coordinator
- Procurement Officer
- FM Officer / Project Accountant
- Accounting Assistant
- Environmental & Social Safeguards Officer
- Monitoring & Evaluation Officer

70. ESCOM will be the implementing agency for Component 1 (Electricity Network Strengthening & Expansion), Component 3 (DSM and Energy Efficiency Measures) and Component 4a (Capacity Building and Technical Assistance for ESCOM). The Government will pass on part of the proceeds of the grant and the entire credit to ESCOM to enable it to implement the components under its responsibility. A Subsidiary Agreement will be signed between GoM and ESCOM to this end. ESCOM has assembled a Project Management Unit (PMU), composed of the following officials:

- Project Coordinator & Deputy Project Coordinator
- Senior Engineer
- Engineer/Procurement Officer
- FM Officer / Project Accountant
- Accounting Assistant
- Environmental & Social Safeguards Officer
- Performance Management Engineer (covers M&E)
- Demand Side Management Officer

Project Management Structure



71. **Annual Work Plans.** The two implementing agencies will coordinate in the areas of project and procurement planning, and the monitoring and evaluation of project outputs. Regular working sessions between the ESPS at MoNREE and the ESCOM PMU shall be held to prepare comprehensive Annual Work Plans (drawing on, inter alia, the detailed procurement plans prepared for the project), which state the activities of each component and their respective implementation schedules. These Annual Work Plans will be provided for review and approval to the Technical Electricity Committee, Project Steering Committee and the World Bank.

72. **Project Implementation Manual**. In order to guide the implementation process, the implementing agencies will jointly prepare and adopt a Project Implementation Manual. This will cover all aspects of administrative, financial, technical and organizational arrangements and procedures that will be required for successful project implementation. Adopting the Project Implementation Manual is a condition of project Effectiveness.

73. **Progress Reports.** The ESPS will draft, on behalf of the whole project, biannual Progress Reports on the implementation status of the project against the Annual Work Plans. The reports will review procurement and physical implementation progress, financial performance, and the progress towards achievement of the agreed results outputs and outcomes. The ESPS project co-ordinator will provide these reports to the Technical Electricity Committee for formal dissemination to the Project

Steering Committee and to the World Bank. The ESCOM PMU co-ordinator will be responsible for ensuring that detailed information regarding activities implemented by ESCOM is supplied in a timely manner to the ESPS co-ordinator.

74. The two implementing agencies will receive support on environmental and social safeguards issues from their respective Environment and Social Management Units (ESMU). These two ESMUs will take the lead on safeguards-related aspects of the project. It is assessed that, with support, both ESMUs can effectively manage the low impact safeguards issues expected under the project. However, as part of the project, and as described below in the Safeguards section, both ESCOM and MoNREE will continue to strengthen their ESMUs.

B. Results Monitoring and Evaluation

75. The primary focus for quantitative and qualitative Monitoring & Evaluation (M&E) of the project's results will be on Component 1 and 3 of the project, given that Component 2 is composed solely of feasibility studies. ESCOM will have the responsibility to supply up-to-date data on the set of agreed performance indicators (set out in Annex 1), at least on an annual basis for the three PDO indicators and on a semi-annual basis for the intermediate outcome indicators at component level. M&E inputs will be based on both technical survey and administrative data sources. The baseline indicators developed by ESCOM draw from existing ESCOM data and project preparation studies. In addition, critical data will be supplied from the Consulting Engineer that will support ESCOM in project implementation in Component 1 (including via provision of necessary technical equipment and development of utility performance measurement indices).

76. Using the indicators and data mentioned above the ESPS at MoNREE will prepare, on behalf of the TEC, consolidated Project Reports covering all components of the project. Each Project Report will cover one calendar semester (6 months), and shall be furnished to the World Bank not later than forty-five days after the end of the period covered in the report. The consolidated report will incorporate a separate Project Report prepared by ESCOM, with the latter being obliged to furnish this to MoNREE not later than thirty days after the end of the reporting period, for incorporation into the consolidated Project Report prepared by MoNREE on behalf of the TEC.

77. The results of the M&E activities will be fed back into the implementation process as improved practices. The ESCOM project co-ordinator, supported by the M&E officer from the Economics Section of ESCOM's in-house M&E unit, will provide data and reports to the Technical Electricity Committee and the World Bank.

78. By and large, Malawi's national M&E system is characterized by weak capacity and fragmentation. Currently neither the energy sector as a whole, nor the electricity sub-sector has an integrated, functioning M&E system or management information system. At the project level, the current capacity of the implementing agencies to monitor and evaluate the outcomes and results of the project is somewhat limited, due to a lack of experience in World Bank or other externally-funded projects.

79. Comprehensive M&E capacity strengthening initiatives are proposed, primarily a thoroughgoing reform of ESCOM's management information system, to be financed via the MCC Compact. While this will, in future, provide ESCOM management a comprehensive and accurate picture of key metrics in ESCOM's operations, particularly in its commercial performance,

implementation of this system will not be a prerequisite for effective M&E of the proposed WB-financed project, given the arrangements noted above.

80. However, as part of the project's Component 4 (**Capacity Building & Technical Assistance**), financing will be made available for general institutional strengthening of the project management units at MoNREE and ESCOM, including for M&E systems and staff.

C. Sustainability

81. The Government of Malawi is fully committed to supporting this project. The Ministry of Finance has confirmed that customs, excise and VAT exemptions will be in place for all imported goods for use under the project.[9] ESCOM's management has demonstrated its commitment by its highly responsive and active support for this project during the preparation phase. In addition, as described above, the Government has written a 'Letter of Intent' that sets out a program of energy sector reforms that it proposes to implement over the lifetime of the project.

V. Key Risks and Mitigation Measures

Main Project Risks	Mitigation Measures	Risk Rating
ESCOM and MoNREE's limited experience of WB-financed projects may lead to implementation delays	• Both MoNREE and ESCOM have established dedicated project teams (the ESPS for MoNREE, a PMU for ESCOM) The core staff of these units have been selected from among those with most experience in WB procedures. • Consulting Engineers will be hired to help with project engineering design, preparation of procurement documents, and supervision of supply & install contracts in Components 1 & 3. • Component 4 provides for resource to build capacity (including for procurement and/or FM consultants to assist in implementation) and specialised training • A one-week WB procurement workshop in Lilongwe, tailored to the energy sector and led by a HQ-based procurement specialist, was held in April 2011 to prepare the project teams for implementation.	Medium-L[10]
Fiduciary risks including lack of effective FM oversight.	The project's implementing agencies are familiar with stringent governance, control and oversight requirements. Inherent risks are offset by (a) professional FM staff experienced with projects; (b) a robust internal control system, which allows the segregation of functions; and independent internal and external audit; and (c) sound financial procedures and systems.	Medium-I[11]

[9] However, withholding taxes for consultants and VAT for domestically-sourced goods will continue to be applicable, in line with the Government of Malawi tax code.
[10] 'Medium-L' represents low impact / high likelihood, in line with the ORAF framework terminology
[11] 'Medium-I' represents high impact / low likelihood, in line with the ORAF framework terminology

Main Project Risks	Mitigation Measures	Risk Rating
Difficulty or delays in implementing the project, due to a lack of technical / project management / contract management capacity, particularly in Component 1b which will be implemented by ESCOM services.	• The project will finance an enhancement of ESCOM's existing Training School in Blantyre, via a dedicated team of trainers to deliver a comprehensive, hand-on training program for ESCOM linesmen and technicians. The linesmen implementing Component 1b will hence be trained before undertaking the work. • A Consulting Engineer will play an independent verification / 'due diligence' role in Component 1b, to provide assurance to ESCOM management and the WB that works are proceeding correctly.	Medium-L
Insufficient progress with reform of energy sector policy and legal framework, coupled with continuing financial weakness at ESCOM, reduces likelihood of private sector participation in new generation projects. This in turn may reduce the utilization of feasibility studies undertaken.	• Ongoing policy dialogue with GoM on sector reform to continue during project implementation. In addition, MoNREE has prepared a Letter of Intent setting out energy sector reforms that GoM intends to implement during the project implementation period. • Both the MCC Compact and the WB-financed project will (separately but cumulatively) improve ESCOM's financial position by reducing loss rates. MCC's Compact will also focus on improving ESCOM's commercial performance.	Low
Financial constraints at ESCOM may hamper proper maintenance of the new and upgraded transmission and distribution network components and hence sustainability of the project results	• Cumulative tariff increases of 61 % during 2009-2010 have led to nascent improvements in ESCOM's financial position and put the company on the path of financial sustainability. These tariff increases also improve the financial case for the limited peri-urban grid extension being financed in the project. Pre-paid meters will ensure high collection rates for these new customers. GoM has agreed to a phased implementation of full-cost recovery tariffs and schedules according to a timeline to be determined. • Keeping firm control of costs, reducing loss rates and improving commercial collection rates will be critical factors for financial sustainability. Continued implementation of ESCOM's Financial Plan will help consolidate the financial position. In addition, the expected reduction in technical loss rates and system bottlenecks from Component 1 activities will enhance sales. • In parallel, the MCC Compact will finance upgrades to ESCOM's Management Information Systems, particularly focused on improving commercial collection performances and reducing payment arrears.	Medium-I
Overall Risk Rating (before mitigation measures)		Medium-I

82. **Effectiveness conditions:**

- The Subsidiary Agreement has been executed on behalf of GOM and ESCOM
- The Subsidiary Agreement has been duly authorized or ratified by GOM and ESCOM and is legally binding upon GoM and ESCOM in accordance with its terms.
- GoM has adopted a Project Implementation Manual.

83. **Disbursement condition:**

- No disbursement for compensation payments financed by IDA shall be made unless a RAP has been approved by the Association.

84. **Covenant:**

- GoM and ESCOM shall maintain or cause to be maintained a financial management system in accordance with the provisions of Section 4.09 of the General Conditions.
- GoM shall have the project's Financial Statements audited, covering all project components. Each audit of the Financial Statements shall cover the period of one fiscal year of GoM. The audited Financial Statements for each such period shall be furnished to the Association not later than six months after the end of such period.
- GoM will prepare and furnish to the Association not later than forty five (45) days after the end of each calendar quarter, interim unaudited financial reports for the Project covering the quarter and covering all project components, in form and substance satisfactory to the Association.
- ESCOM shall have its corporate financial statements audited by independent auditors acceptable to the Association, in accordance with consistently applied auditing standards acceptable to the Association. Each audit of these financial statements shall cover the period of one fiscal year of ESCOM. ESCOM shall ensure that the audited financial statements for each period shall be: (a) furnished to GoM and the Association not later than six months after the end of the period; and (b) made publicly available in a timely fashion and in a manner acceptable to the Association.
- ESCOM will maintain a ratio of total operating revenues to total operating expenses of not less than 1.0
- ESCOM will maintain a ratio of current assets to current liabilities of not less than 1.0
- ESCOM will ensure that the estimated free cash flows from its operating activities shall be at least 1.0 times the estimated maximum debt service requirements for any such Fiscal Year on all its debt.[12]

VI. Appraisal Summary

A. Economic and Financial Analysis

85. **Economic Analysis**. An economic analysis of the project suggests that the proposed project is economically viable. The projected base economic internal rate of return (EIRR) is 26.0 percent, with net economic benefits of US$142.9 million at a 10 percent discount rate. The economic benefits are assumed to derive mainly from (i) additional electricity supply from new and upgraded substations, transmitted through the new and rehabilitated distribution lines supported under the project, and (ii) electricity and capacity savings from improved energy efficiency in demand side

[12] Precise definitions of these terms are provided in the Project Agreement.

appliances. Cost of supply – rather than actual revenue streams – is used as a proxy to value these additional electricity and capacity benefits that become available through the project because the existing tariff arrangements artificially keeps the retail tariffs lower than the cost of supply.[13] Sensitivity analysis carried out demonstrates that the project remains economically viable against a simultaneous 15% increase in investment cost and 15% drop in the stream of economic benefits.

Summary of Economic Analysis

	Base Case	Capex +15% (A)	Benefit -15% (B)	Both (A) and (B)
NPV @ 10% (US$ million)	142.9	130.6	108.6	97.5
EIRR (%)	26.0%	23.2%	22.7%	20.4%

86. **Project Financial Analysis.** A financial analysis of the proposed project was carried out to estimate the financial internal rate of return (FIRR) and NPV of the project. The analysis indicates that the proposed project is financially viable. FIRR of the project is 16.9 percent and its NPV is US$62.1 million at 10 percent discount rate. Sensitivity analysis carried out demonstrates that the project remains financially viable against a simultaneous 15% increase in investment cost and 15% drop in financial revenues:

Summary of Project Financial Analysis

	Base Case	Capex +15% (A)	Revenue -15% (B)	Both (A) and (B)
NPV @ 10% (US$ million)	62.1	49.4	40.1	27.4
FIRR (%)	16.9%	15.0%	14.7%	13.0%

87. **ESCOM's Financial Performance.** ESCOM has been financially constrained and its financial performance has been volatile as shown by key financial ratios in the table below because the electricity tariff has not been set at cost recovery level and its asset turnover has been low. Its current ratio (current assets: current liabilities) has been below 1.0 and its cost recovery ratio has been fluctuating significantly. Although ESCOM's debt service coverage ratio appears high, it only reflects that the company could not service its debts in these years. However, ESCOM has been implementing a Financial Sustainability Plan, supported by a PPIAF grant, which includes activities to improve its financial viability. It is notable that some performance measures, such as the company's collection efforts shown by the number of days receivables, are on the improving trend, albeit from a low performance level. Moreover, the Government and ESCOM have been undertaking debt-equity swaps to consolidate its capital structure, and conversion of remaining Government debt into equity is expected by end of CY 2011. In November 2009, MERA approved a 56.2 percent increase in electricity tariffs over four years between 2010 and 2013; the increase was implemented in two stages with a 36.0 percent increase taking place in December 2009, with the second tranche of 20.2 percent (relative to electricity tariff levels prevailing at the time, which effectively translated

[13] Insufficient data was available to allow other indicators, such as willingness-to-pay, to be used.

into the overall tariff increase of 61 percent) implemented in January 2011. The impacts of this increase can be observed from the improvements in company's financial positions.

Financial Ratios of ESCOM

FY	2006	2007	2008	2009	2010
Operating Indicators					
Return on Total Assets	3.0%	-2.9%	-9.4%	-3.2%	0.3%
Return on Equity	9.1%	-8.8%	-34.4%	-15.7%	1.5%
Return on Sales (Profit element of revenues)	14.2%	-12.7%	-33.4%	-12.3%	0.8%
Growth in Revenues		10.7%	28.2%	-4.2%	31.0%
Cost Recovery Ratio	99.0%	107.0%	78.2%	87.0%	106.1%
Asset Turnover	0.21	0.23	0.28	0.26	0.33
Return on Net Fixed Assets	26.4%	25.2%	41.4%	34.3%	35.3%
Capital Adequacy Indicators					
Debt Service Coverage Ratio	1.66	2.25	1.76	1.78	2.58
Debt to Equity	2.0	2.1	3.4	4.5	4.5
Debt to Assets	0.7	0.7	0.8	0.8	0.8
Liquidity Ratios					
Current Ratio	1.0	0.5	0.4	0.4	0.3
Average Days' Electricity Receivables	268.24	209.52	163.70	155.57	144.20
Average Days' Payables	102.87	68.11	68.14	98.90	95.66

88. **ESCOM's Financial Projections.** A projection of ESCOM's financial position suggests that if some key assumptions will be met, the company's financial performance will gradually improve from its virtually insolvent state, as shown in the table below. These key assumptions include: (i) conversion of ESCOM's outstanding Government debt, amounting to MK11.9 billion, into equity before FY2013; (ii) implementation of the automatic tariff adjustment mechanisms to cushion the effects, inter alia, of foreign exchange fluctuations; (iii) ESCOM can regain access to concessional lending amounting to MK3.3 billion; and (iv) successful implementation of the MCC-funded investment projects, including the requirement for Government to finance ESCOM's working capital requirements over the Compact period.[14] Moreover, given that the company has already accumulated over MK9.8 billion losses over the years, fully cost-reflective tariffs will be crucial to support its funding requirements and to turnaround its financial performance. The MCC's assistance to ESCOM requires, among others, the debt restructuring be implemented as a preceding condition for making the Compact effective. In addition, the MCC will support activities that will address ESCOM's financial and operational turnaround as well as strengthen regulatory management in the sector. For example, a cost of service study for tariffs will be undertaken, accompanied by support to make the case for fully cost-reflective tariffs. For these reasons, this project will continue to collaborate and harmonize its approach with the MCC to the extent possible, although it remains a stand-alone project as noted above.

[14] The amount remains to be determined in discussions between GoM and MCC.

Projected Financial Ratios of ESCOM

FY	2011	2012	2013	2014	2015	2016	2017
Operating Indicators							
Return on Total Assets	6.9%	3.6%	2.6%	1.3%	0.6%	0.4%	0.9%
Return on Equity	34.2%	10.0%	6.1%	3.8%	1.9%	1.4%	3.7%
Return on Sales (Profit element of revenues)	16.9%	9.5%	7.6%	4.5%	2.1%	1.4%	3.3%
Growth in Revenues	36.8%	11.3%	12.1%	11.2%	11.5%	11.9%	15.3%
Cost Recovery Ratio	123.0%	112.4%	109.9%	106.1%	103.3%	101.4%	104.3%
Asset Turnover	0.41	0.38	0.33	0.29	0.27	0.26	0.28
Return on Net Fixed Assets	39.2%	40.4%	35.4%	31.3%	29.3%	28.3%	29.1%
Capital Adequacy Indicators							
Debt Service Coverage Ratio (cash)	(1.30)	(5.14)	3.37	3.13	2.59	2.28	1.63
Debt to Equity	3.6	1.1	1.6	2.1	2.6	3.1	3.0
Debt to Assets	0.8	0.5	0.6	0.7	0.7	0.8	0.8
Liquidity Ratios							
Current Ratio	0.7	1.9	2.0	2.0	2.0	1.9	1.9
Average Days' Electricity Receivables	126.90	111.67	98.27	86.48	76.10	66.97	58.93
Average Days' Payables	96.00	91.20	86.64	82.31	78.19	74.28	70.57

89. The proceeds of the IDA credit will be on-lent by Government of Malawi to ESCOM on standard IDA credit terms; similarly, the relevant portions of the grant will be passed on as a grant. The financial covenants for ESCOM are shown in Section V above. Due to the weak financial state of ESCOM, the financial covenants are kept at meaningful yet minimum levels.

B. Technical

90. This section summarizes the technical basis of project preparation for the four components of the proposed project.

91. Regarding Component 1a, as noted above, the Millennium Challenge Corporation (MCC) has developed a large program to improve the reliability and quality of power in Malawi via a strengthening of the generation, transmission and distribution system. As part of the Compact development, MCC financed extensive engineering feasibility studies of the grid system.[15] These studies identified and costed a large set of urgent activities needed to stabilise and strengthen the generation, transmission and distribution systems.

92. The feasibility study consultants used the DIgSILENT software packages for load flow studies, to develop and analyze technical requirements for the rehabilitation and upgrade of transmission and distribution (including network extension) projects. The resulting load flow studies provided measures of technical feasibility regarding maximum power transfer, acceptable voltage levels and profiles, and reduction in losses.

93. In a co-ordinated effort, both the MCC Compact and Component 1a of the proposed World Bank-financed project use these feasibility studies as the basis for their investments. As such, the two sets of investments are highly complementary. In addition, as part of the project preparation process,

[15] Malawi Power System Project Studies, ICF International and CORE International, August 2010.

the World Bank team has (i) carefully reviewed the engineering aspects of the feasibility studies, (ii) conducted field visits to assess the technical standards and criteria proposed, and (iii) discussed project design and scope with ESCOM. This has resulted in a carefully-prepared set of investments for Component 1a of the project. At the same time, care has been taken to ensure that the investments in Component 1a have been selected in such a way that they constitute a stand-alone set of activities that does not depend on the MCC investments for successful implementation and the achievement of the expected results. The IDA financing supports a stand-alone project and is not part of any joint co-financing. Achieving the project's Development Objective and the expected results does not depend on implementation of or progress in the MCC Compact.

94. In addition, project preparation in Component 1a has relied on further studies and technical assessments:

- To reduce the reactive power losses in the distribution system, capacitor banks will be installed near the load centers. The investments will be made on the basis of a technical study conducted by ESCOM on the location and the capacity of the capacitor banks.
- ESCOM faces a critical shortage of spare parts for its generation stations due to limited budgetary funds for maintenance The Bank will finance emergency spare parts for the Tedzani I, II & III, Nkula B and Kapichira stations. [16]

95. The technical core of Component 1a employs modern technology and best engineering practices in electricity network strengthening and expansion. Following review of the available studies, all transmission, distribution (including LV reticulation) and peri-urban network expansion activities have been grouped into major project packages based on functional requirements:

(i) Construction of new transmission substations and associated feeders to enable more reliable and efficient operation of the transmission and distribution system and to minimize O&M costs and outage duration
(ii) Uprating of existing substations with larger capacity transformers and replacement of old, overloaded equipment with more efficient equipment designed to modern industry standards
(iii) Construction of new distribution lines and capacitor banks (compensating reactive power at the level of MV substations to enhance quality of service for the maximum number of customers)
(iv) Rehabilitation of distribution lines
(v) Rehabilitation of underground cables
(vi) Extension of the peri-urban network
(vii) Supply of urgently-needed generation spare parts

96. From a power engineering perspective, the technical needs for strengthening and expanding the electricity system have been determined as a result of the appraisal process (such as the need for new substations, or the starting and end point of necessary new distribution lines) and are described in more detail in Annex 2. However, the precise geographical locations have not yet been determined for most activities[17]. These will not be fully established until detailed engineering planning is undertaken during project implementation by the contractors.

[16] Nkula A is being rehabilitated as part of the MCC Compact.
[17] The only exceptions are the rehabilitation of existing substations and distribution lines. Some of the planned rehabilitation works are not expected to have adverse environmental and social impacts; in other cases, the technical details on the civil works are yet to be finalized. The social and environmental impacts of these activities are expected to be minimal and are fully dealt with via the ESMF and RPF.

97. Regarding Component 1b, ESCOM has undertaken a detailed study of its LV reticulation system, in order to assess the following technical needs: (i) the required reconfiguration and extension of medium voltage overhead lines (11kV and below), (ii) the required capacities and numbers of distribution transformers (such as pole-mounted MV/LV step-down transformers), (iii) line lengths and approximate routes of new three-phase LV overhead lines, and (iv) areas where conversion of single phase to three phase low voltage overhead lines is required. These studies and associated detailed costing have formed the basis for the WB appraisal of Component 1b. As with Component 1a, while the technical needs have been determined, precise geographical locations for the activities will not be fully established until the project implementation phase.

98. Via Component 1b, the project will finance the material, equipment and associated tools for activities in low-voltage reticulation that will improve quality and reliability of supply in the major urban load centers. ESCOM's own technical service will install the equipment. In addition, in order to develop capacity and skills of the linesmen and technician, ESCOM's existing training school will be enhanced for the duration of the project by a dedicated team of trainers on a consultancy contract from an international firm with experience in this area.

99. Component 2 of the project will finance hydroelectric power generation feasibility studies to investigate several key sites, including Lower Fufu and Mpatamanga, each with potential capacity of over 100 MW on major rivers in Malawi, as well as a smaller site of less than 50MW near Dwangwa. These sites have been previously identified and studied at a preliminary level via the 1998 Power System Development Study ('Master Plan') and confirmed by the 2004 Integrated Resource Plan. In addition, in the case of Lower Fufu, a pre-feasibility study has previously been undertaken, which confirmed the suitability of the site for development. To provide additional capacity to evacuate power from the north of the country, and to provide redundancy in transmission capacity, a feasibility study for a new 'inland' transmission backbone line that would run north-west from Lilongwe via Kasungu to Mzuzu (approximately 350km) will be financed.

100. Component 3 of the project will finance Demand Side Management (DSM) and Energy Efficiency (EE) activities. A detailed study financed by DFID on the potential for DSM activities (focused on a CFL installation program in the first instance) has been part of the technical basis for this component. In addition, ESCOM has undertaken detailed assessments, including a cost-benefit analysis, of various different DSM and EE options, in order to identify the best activities for project support. The proposed investments include (i) de-rating of Hot Water Geysers (HWGs) heating elements to reduce peak loads, (ii) installation of insulation blankets in HWGs for energy efficiency purposes, and (iii) wireless load control to remotely manage peak HWG loads.

101. Component 4, Capacity Building and Technical Assistance, will provide institutional strengthening and technical assistance to both MoNREE and ESCOM. For ESCOM, the activities will include (i) software and equipment to support distribution planning and training of ESCOM staff, and (ii) equipment for training school activities. For MoNREE, activities will include (i) a wind power resource study, (ii) a preliminary assessment of geothermal prospects, and (iii) an assessment of constraints to increased bagasse co-generation capacity.[18] For both ESCOM and MoNREE this component will include resources for training in WB procurement, FM procedures, environmental &

[18] These TA activities for development of alternative renewable energy resources have previously been identified in the 2009 Country Economic Memorandum jointly undertaken by the WB, AfDB, MCC and DFID and thus build on ESW previously undertaken in the sector.

social safeguard issues etc. The capacity-building activities have been identified and prepared via discussions with ESCOM and MoNREE management.

C. Financial Management

102. A Financial Management (FM) assessment of the Ministry of Natural Resources, Energy and Environment and ESCOM was conducted. Both implementing agencies will maintain a financial management system and will prepare unaudited interim financial reports (IFRs) on a quarterly basis for the activities they implement, in line with the project's covenants. MNREE will prepare a consolidated IFR for the whole project that will be sent to the World Bank together with the two individual IFRs.

103. The objective of the FM assessment was to determine: (a) whether the entities have adequate FM arrangements in place to ensure the funds will be used for the purposes intended in an efficient and economical manner and that they will be capable of correctly and completely recording all transactions and balances related to the project; (b) the project's financial reports will be prepared in an accurate, reliable and timely manner; (c) the project's assets will be safely guarded; and (d) the project will be subjected to auditing arrangements acceptable to the WB.

104. The overall FM risk is considered **Moderate.** The inherent risks are offset by: (a) professional FM staff experienced with projects; (b) a robust internal control system, which allows for segregation of functions; and independent internal and external audit; and (c) sound financial procedures and systems.

105. The assessment complied with the Financial Management Manual for World Bank–Financed Investment Operations that became effective on March 1, 2010 and AFTFM Financial Management Assessment and Risk Rating Principles.

106. ESCOM's accounting system is fully computerized and supported by a detailed accounting manual that sets out policies and procedures to be followed in processing transactions. The entity prepares monthly management accounts which are reviewed by senior management and additionally submits to the Board quarterly management accounts. The Board has a Finance and Audit subcommittee which scrutinizes the management accounts as well as Internal Audit reports. ESCOM's Internal Audit Department is not adequately staffed and consequently fails to cover some areas of the organization. MoNREE will process project transactions using Excel spreadsheets. The transactions will also be subject to internal audit by the Central Internal Audit Department.

107. The project accounting records will be processed using ESCOM's computerized system, but with such transactions being separately identifiable through appropriate use of Chart of Accounts. ESCOM has identified and put in place a dedicated and well qualified personnel complement for project FM (a Chief and Project Accountant). The project FM staff have received training and have experience in World Bank FM and disbursement procedures and requirements and will receive further training. They have the basic capability to control and monitor the financial performance of projects.

108. The Financial Management assessment concluded that the financial management arrangements meet the Bank's minimum requirements under OP/BP 10.02. Further details are provided in Annex 3.

D. Procurement

109. Procurement under the Energy Sector Project will be carried out in accordance with the World Bank's "Guidelines: Procurement under IBRD Loans and IDA Credits" dated January 2011 and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated January 2011 and the provisions to be stipulated in the Legal Agreement. The use of World Bank Standard Bidding Documents for contracts under International Competitive Bidding Procedures and consultants contracts involving international consultants beyond a threshold that will be defined in the Procurement Plan would be mandatory. For procurement below the defined thresholds for ICB, Government of Malawi Public Procurement Law and associated bidding documents, which have been reviewed and found acceptable by the Bank, would be used subject to certain exclusions.

110. The "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants", dated October 15, 2006 and updated January 2011, shall apply to the project.

111. Procurement under the Project is carried out by Ministry of Natural Resources, Energy and Environment (MoNREE) and Electricity Supply Corporation of Malawi (ESCOM) which responsible technical aspects of the project. MoNREE will be responsible for feasibility studies and MoNREE's Internal Procurement Committee will be responsible for award of contracts. On the other hand ESCOM has its own Internal Procurement Committee which is responsible for award of contracts. The overall capacity of MoNREE and ESCOM to carry out procurement activities under the Project is rated **Satisfactory**. Further details are provided in Annex 3.

E. Social (Including Safeguards)

112. Given the nature of the work to be undertaken in the rehabilitation, upgrade and extension of the distribution and transmission systems (in Component 1 of the project), land acquisition requirements are expected to be limited. The project will finance four 'greenfield' substations, none of which would affect structures or tree crops, only agricultural land or bush. While the approximate sites where the substations are to be situated have been chosen, on the basis of system technical demands and availability of land, the precise locations are not yet known. All of the substations to be financed ('greenfield' and uprating of existing) are at 66kV or below, with the exception of one 132/66/33kV transformer to be up-rated, and one new 132/33kV substation. All new lines will be at distribution voltages (33kV and below), significantly reducing any resettlement or compensation needs. Nonetheless, because these new substations and distribution lines will be built, World Bank safeguards policy OP/BP 4.12 for Involuntary Resettlement is triggered.

113. Because of this need to acquire land for new substations, the need for limited land acquisition in some cases for the new 33 and 11 kV distribution lines, as well as the likelihood of crop damage during rehabilitation of existing distribution lines, a **Resettlement Policy Framework** (RPF) has been prepared.

114. As the precise locations of most of the activities in Component 1 can only be determined following detailed engineering planning and design work, it has not been possible to prepare RAPs at this stage of the project cycle. In the event that a full or abbreviated RAP is needed, its preparation disclosure and implementation would be completed before the start of any construction. For a limited number of rehabilitation activities in Component 1, the location of project works is known

(for example, the routes of existing distribution lines). The project appraisal has confirmed that no social impacts are expected from these activities. Nevertheless, for these activities the RPF prepared for the project provide a comprehensive framework to cover all eventualities during project implementation.

115. For the distribution line activities, much of the land to be acquired is non-arable and uninhabited as distribution lines tend to be located in more settled areas; as such, this land will not have been allocated for use and thus will require no compensation. Compensation for assets and land would apply wherever the distribution line projects would displace users or residents or their assets. In those cases where cash payments are the appropriate compensation method, the proceeds of the IDA financing will be used for those payments, in line with the formal request received to this end from the Government of Malawi.

116. ESCOM's Environmental and Social Management Unit (ESMU) will be responsible for implementing the RPF, as well as preparation and implementation of full or abbreviated RAPs if necessary, including conducting consultations with PAPs and local communities.

117. As part of the ongoing project implementation process, an Environmental and Social Impact Assessment (ESIA) will be prepared. This will include detailed screening of the specific sites for project activities which, given the nature of the electricity distribution investments in this project, are not yet known.

F. Environment (Including Safeguards)

118. Given the nature of the work to be undertaken in the rehabilitation, upgrade and extension of the distribution and transmission systems (distribution-voltage 33kV and 11kV lines only; substations at 66kV or below, with the exception of one 132/66/33kV transformer and one new 'greenfield' 132/33kV substation), no significant environmental and social impacts are foreseen from project activities. Accordingly, the project has been classified as EA Category B and it triggers OP/BP 4.01 for Environmental Assessment, because of the relatively minimal possible negative impacts that may occur from the physical investments. The project also triggers OP 4.11 for Physical Cultural Resources, as some of the works may affect cultural assets. A screening mechanism is included in the ESMF to ensure that any such sites are identified and avoided or impacts are mitigated, in line with OP 4.11. Awareness of possible chance finds will be raised among the public, the project contractors and operators, and chance-find procedures will be included in construction contracts. While the ESMF suggests that critical natural habitats may be affected by the project, the appraisal has confirmed that OP 4.04 (Natural Habitats) is not triggered in this project.

119. As noted in the project description, the grid strengthening & expansion activities under Component 1 are predominantly in the distribution sub-sector. As noted above, the project will finance four 'greenfield' substations, none of which would affect structures, protected areas, forests or tree crops. All new lines will be at distribution voltages (33kV and below). No large scale or irreversible impacts are envisaged from installation works.

120. An **Environmental and Social Management Framework** (ESMF) document has been prepared to describe the principles and procedures to be followed in addressing the relevant safeguards policies that will be triggered by the proposed project. The ESMF provides a framework to manage all eventualities, as well as a detailed screening methodology and form. In addition, the

ESMF lists all possible negative impacts for various phases of the project and how these will be managed.

121. The Project involves many proposed individual activities that will not be fully defined in terms of location and impact until detailed engineering planning and design (for example, determining distribution line routes) is undertaken during project implementation. As noted above, preparation of an ESIA will continue during project preparation and implementation. Drawing on the findings of the ESIA, an Environmental and Social Management Plan (ESMP) would be drawn up and implemented during project implementation. In addition, for the low impact activities such as the expansion of the distribution network, the bidding documents and contractor's contracts will (as set out in the ESMF) also include the requirement to prepare and implement an ESMP, specifying the environmental, social, health and safety measures that will need to be managed and mitigated by the contractor during installation works. In addition, the Consulting Engineer will have the responsibility to supervise the adequate implementation of the environmental, social, health and safety clauses by the contractors.

122. For a limited number of rehabilitation activities in Component 1, the location of project works is known (for example, the routes of existing distribution lines). The project appraisal has confirmed that no environmental impacts are expected from these activities. Nevertheless, for these activities the ESMF prepared for the project provide a comprehensive framework to cover all eventualities during project implementation.

123. ESCOM's Environmental and Social Management Unit (ESMU) will have particular responsibility for the screening process set out in the ESMF, the categorization of results and the determination of the necessary follow-up actions. The project will finance capacity building activities for ESCOM's ESMU.

124. **Riparian Notification.** Component 2 of the project includes feasibility studies for possible future hydropower generation on the Shire River and the tributaries that eventually enter it. The Shire River is considered an international river. For this reason, the project also triggers OP 7.50 for projects on international waterways. A notification letter and an accompanying information memorandum was prepared by MoNREE and was sent out to the relevant riparians on 24 March 2011. The information memorandum notes that the hydropower-related activities will be limited to feasibility studies only; no physical investments will be made at any of the sites to be investigated. Accordingly, there will be no impact in the flows of the Shire and Zambezi rivers or any other waterway as part of this particular project. It is the assessment of the Bank staff that have prepared this project that this project will not cause appreciable harm to the other riparians, and will not be appreciably harmed by the other riparians' possible water use. No objections to the project were received from the riparians within the time period stipulated in the notification.

125. The following table summarises which safeguards policies are triggered by the project. Annex 3 provides further details.

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment (OP/BP 4.01)	X	
Natural Habitats (OP/BP 4.04)		X
Pest Management (OP 4.09)		X
Physical Cultural Resources (OP/BP 4.11)	X	

Involuntary Resettlement (OP/BP 4.12)	X	
Indigenous Peoples (OP/BP 4.10)		X
Forests (OP/BP 4.36)		X
Safety of Dams (OP/BP 4.37)		X
Projects in Disputed Areas (OP/BP 7.60)		X
Projects on International Waterways (OP/BP 7.50)	X	

Annex 1: Results Framework and Monitoring
Malawi: Energy Sector Support Project

Project Development Objective (PDO): To increase the reliability and quality of electricity supply in the major load centers

PDO Level Results Indicators	Core	Unit of Measure	Baseline	Cumulative Target Values					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Indicator Definition
				YR 1	YR 2	YR3	YR 4	YR 5				
Indicator One: Reduction in electricity losses per year in the project areas	☒	%	17.4 [19]	17.4	17.4	16.4	14.4	13.4	Annual	ESCOM	ESCOM	Distribution losses, as per core indicator description
Indicator Two: Total Interruption Time per KVA Installed (TITK) per year in the project areas	☐	Number	2.6	2.6	2.6	2.3	2.2	2.2	Annual	ESCOM	ESCOM	∑ (KVA disconnected during outages)*(duration of outages in hours per month)/Installed capacity KVA[20]
Indicator Three: Direct Project Beneficiaries (number) [21] - of which female %	☒	Number (%)	0 (50%)	0	0	13,000 (50%)	32,000 (50%)	47,000 (50%)	Annual	ESCOM	ESCOM	Customers benefiting from improved distribution lines and upgraded substations

[19] This indicator is for the distribution sub-sector only. ESCOM's measurement system does currently not allow distinguishing between technical and non-technical distribution losses, nor separately measure individual load centres. Due to the limited size of Malawi's national electricity system, baselines and targets will be measured at the system-wide level in the first instance. As part of the project's activities, installation of feeder meters in distribution transformers will allow a more detailed measurement of losses in individual load centres, allowing a more detailed baseline to be determined.

[20] Refers only to unplanned outages; does not incorporate load-shedding. ESCOM's measurement system does currently not allow separate measurements for individual load centres. As part of the project's activities, installation of feeder meters in distribution transformers will also allow a more detailed measurement of TITK in individual load centres, allowing a more detailed baseline to be determined.

[21] Comprised of number of people provided with access to electricity + number of customers benefitting from insulation blankets for HWGs.

INTERMEDIATE RESULTS												
	Core	**Unit of Measure**	**Baseline**	**YR 1**	**YR 2**	**YR3**	**YR 4**	**YR 5**	**Frequency**	**Data Source/ Methodology**	**Responsibility for Data Collection**	**Indicator Definition**
Intermediate Result (Component One): Electricity Network Strengthening and Expansion												
Indicator One: Number of people provided with access to electricity under the project by household connections	☒	Number	0	0	0	8,000	20,000	27,000	Annual	ESCOM	ESCOM	New HH electricity connections multiplied by avg. HH size of 4.5
Number of new substations constructed	☐	Number	0	0	0	0	1	4	Annual	ESCOM	ESCOM	
Number of substations upgraded	☐	Number	0	0	0	0	3	5	Annual	ESCOM	ESCOM	
Distribution lines constructed or rehabilitated (i) Constructed lines (km) (ii) Rehabilitated lines (km)	☒	km	(i) 0 (ii) 0	(i) 0 (ii) 0	(i) 0 (ii) 0	(i) 30 (ii) 5	(i) 80 (ii) 15	(i) 115 (ii) 26	Annual	ESCOM	ESCOM	As per core indicator description
Intermediate Result (Component Two): Hydroelectric Power Generation Feasibility Studies												
Number of hydroelectric power generation feasibility studies completed	☐	Number	0	0	0	0	2	3	Annual	MoNREE	MoNREE	
New transmission backbone feasibility study completed	☐	YES/NO	NO	NO	NO	NO	YES	YES	Annual	MoNREE	MoNREE	
Intermediate Result (Component Three): Demand Side Management (DSM) and Energy Efficiency Measures												
Indicator Four: Reduction in peak demand of existing customers	☐	MW	0	0	0	2	5	8	Annual	ESCOM	ESCOM	
Number of reduced capacity heating filaments installed	☐	Number	0	0	0	3,000	7,000	11,000	Annual	ESCOM	ESCOM	
Number of insulation blanket installed	☐	Number	0	0	0	5,000	12,000	20,000	Annual	ESCOM	ESCOM	
Number of wireless load control device installed	☐	Number	0	0	0	2,000	5,000	17,000	Annual	ESCOM	ESCOM	
Intermediate Result (Component Four): Capacity Building and Technical Assistance												
Preliminary assessment of geothermal prospects completed	☐	YES/NO	NO	NO	NO	NO	YES	YES	Annual	ESCOM	ESCOM	
Wind-mapping study completed	☐	YES/NO	NO	NO	NO	NO	YES	YES	Annual	ESCOM	ESCOM	

Annex 2: Detailed Project Description
Malawi: Energy Sector Support Project

1. The proposed project has four components:
   1) Electricity network strengthening and expansion
   2) Generation and transmission feasibility studies
   3) Demand side management and energy efficiency measures
   4) Capacity building & technical assistance

COMPONENT 1: ELECTRICITY NETWORK STRENGTHENING & EXPANSION (estimated at US$56.2 million, including contingencies)

2. Building on the analysis set out above in the technical section of the Appraisal Summary, this component includes the rehabilitation, upgrade and expansion of priority parts of the existing distribution and transmission system, including extension of the network in selected peri-urban areas.

3. This component will be divided into three sub-components: (1) distribution & transmission upgrading and expansion; (2) LV reticulation reinforcement; and (3) a Consulting Engineer to assist ESCOM during project implementation.

4. In line with the request received from the Government of Malawi, the proceeds of the IDA financing will be used for any cash compensation payments related to the installation of substations and distribution lines under this component.

COMPONENT 1A: DISTRIBUTION & TRANSMISSION UPRATING AND EXPANSION (estimated cost US$41.9 million, including contingencies)

5. The scope of work covers the construction of new distribution and transmission substations (including associated feeders and tie-lines to connect to the existing system), upgrading of transformation capacity and numbers of feeders in existing substations, construction of new 33kV and 11 kV distribution lines, rehabilitating underground cables and a limited extension of the peri-urban network to new customers.

6. **Transmission system upgrade.** The ESCOM network system consists of various 66- kV and 132-kV transmission lines and substations. Since the demand and consumption of the electricity is increasing, additional substation capacity is needed. The project proposes to finance a new transmission-distribution 'interface' substation and upgrade a similar existing substation by adding a new transformer. The upgrading of the existing substation also includes the replacement of old and obsolete oil-type circuit breakers with the safer and lower maintenance cost SF6-type circuit breakers. Old electromechanical protection relays will be replaced with numerical relays to ensure reliability and sustainability of the system.

7. **Distribution system rehabilitation and upgrade.** The Malawian distribution system refers to the 33-kV, 11-kV, and lower (400/230V) voltage systems. As noted above, load growth in the LV distribution networks has been rapid in the recent past. This has led to overloads of most of the distribution transformers in the major load centers. Quality and reliability of supply will be improved through installation of increased transformer capacity and construction of new distribution substations to offload those substations that are currently overloaded and also to cater for the growing

load demand. Construction of new substations will not only offload the existing substations, it will also bring the supply sources closer to the load centers. This will reduce network losses arising from long, radial overhead lines and will also improve voltages to the load centers. The project will also reduce the number of faults due to broken jumpers and blown fuses as the networks will be loaded within their design limits. For the rehabilitation work, the oil-type circuit breakers will be replaced with the safer and lower maintenance cost SF6-type circuit breakers, consistent with international trends. Old electromechanical protection relays will also be replaced with the more reliable and versatile numerical relays, where justified, at the distribution level. In up-rating cable systems, cross-linked polyethylene cables (XLPE) are specified with screened copper conductors and steel wire armoring.

8. Specific activities in this sub-component will include:

Sub component 1A.1: Construction of New Substations & Associated Lines

9. With regard to the construction of new substations and associated lines listed below, the approximate sites of the works are known, but the precise location of the substations and the routes of the incoming lines and/or feeder lines will only be determined following detailed engineering design work to be undertaken by the contractor.

1-Dwangwa area: 132/33 kV substation (Central region)

10. Dwangwa lies between Nkhotakota and Chintheche substations. There is an important sugar cane and ethanol industry in the area. The current power supply to Dwangwa is through a 33kV overhead line from Nkhotakota about 85 km away, and Chintheche about 60km away The load has increased due to expansion of the cane industry in Dwangwa, resulting in low voltages profiles within Dwangwa and increased system losses. The proposed substation would relieve the Nkhotakota 33kV line by bringing the supply source nearer to the load in Dwangwa. Without construction of a new substation the load growth in Dwangwa could no longer be supported through the existing supply..From a technical perspective, the new substation in this area would be a 132/33kV 15 MVA installation, which would be looping in and out of 132 kV Nkhotakota-Chintheche line at Dwangwa. The substation would have three 33kV feeders. The substation will evacuate energy to the cane factory and Dwangwa township and the loads along the line towards Nkhotakota and Kasitu to address the current shortage of supply capacity at Dwangwa and restore voltage regulation to within acceptable limits.

2-Katoto area: 33/11 kV substation (North region)

11. This would be a new 33/11kV substation which would have an installed capacity of 10MVA with two 33kV incoming lines, one from Mzuzu substation and the other from Luwinga substation. Establishment of a new substation is justified on the basis of providing supply capacity to the greater area of Mzuzu city and the new nearby residential area called Katoto. The substation would have three 11kV feeders to supply the developing residential and business area around Katoto.. These three feeders would be connected to Mchengautuwa/Chibavi, and SOS Area and Lusangazi.

3-Kauma area: 33/11 kV substation (Central region)

12. Kauma is the one of five planned new substations to strengthen the network around Lilongwe city and the surrounding peri-urban areas by bringing bulk supply points closer to the load centres. A new 33/11kV substation in the Kauma area would be aimed at providing supply to the developing Area 43, which is a low density housing estate. The substation would be equipped with one 10MVA 33/11kV transformer and its related protection and control panels. The substation would have three outgoing 11 kV feeders, connected to Area 43, Area 12 and Kauma.

4-Bangwe area: 33/11 kV substation (South region)

13. Bangwe town is experiencing rapid electrical load growth from business and residential development activities and as a developing load centre. Therefore, the existing 11 kV distribution line, which sources power from Limbe A substation, has insufficient capacity to supply the Bangwe load center. Therefore a new 33/11kV, 10 MVA capacity substation for the Blantyre city peri-urban areas would bring a stronger source closer to the load centers rather than transmitting over long distances. A new substation would be aimed at supplying power to the peri-urban sites of Bangwe, Namiyango and Mavutho area with three 11kV feeders. The substation would have two 33kV incoming feeders, one from Chigumula 66/33kV Substation and the other from Mapanga 66/33kV Substation. This substation is aimed at offloading the Limbe A 33/11kV substation.

Sub component 1A.2: Uprating Existing Substations

14. With regard to the uprating of existing substations listed below, while the technical requirements have been finalized as a result of the appraisal process, the precise location for the installation of equipment within the substation site and/or the scope of accompanying works – for example, electrical connections or busbar extensions, a control building, feeders for the three dedicated outgoing lines, new transformer, routing of new kV lines – will not be known until detailed engineering design work is undertaken by the contractor. All works would occur within an existing secured substation perimeter, and project appraisal has confirmed that no environmental impacts are expected from the proposed activities. Nevertheless, the ESMF prepared for the project provides a comprehensive framework to cover all eventualities during project implementation.[22]

1-Golomoti 132/66/33kV Substation

15. Golomoti is currently a 132/66kV substation. The existing 15MVA 132/66kV transformer can support the current load at Monkey Bay of 7.5MW as well as the 33kV network around Mua and Kasinje. But uprating of the substation is needed to meet future load growth in the area. The establishment of a new 132/33 kV, 25 MVA transformer extension within the existing Golomoti substation site will strengthen the 33 kV system around the Salima, Balaka and Ntcheu districts and improve reliability for the mining activities at Chipoka in Salima district, as well as the new cement works at Kasinje in Ntcheu district.

16. It is proposed to install a new 25MVA 132/33kV transformer complete with protection and control panels and 3 x 33kV feeder bays with auto-reclosers and isolators to provide a secure supply

[22] In addition, as set out in the ESMF, the contractor will be required to prepare and implement an Environmental & Social Management Plan, which will specify measures to manage and mitigate any environmental issues.

for the region. The 33kV lines are intended to interconnect with the 33kV line from Mua and to also interconnect with Kasinje. Space is available in the existing substation for the new 132/33kV 25 MVA transformers and also three feeder bays.

2-Chinyama 66/33 kV substation

17. This substation is supplied through a 66kV line from Nkhotakota and has a 7.5MVA 66/33kV transformer which is currently loaded at over 80% of rated capacity. The current load is expected to rise by 10.5 MW when the Shayona Cement factory extension is completed. Thus, a larger capacity transformer is required for the anticipated load growth around Chinyama substation. The existing transformer will be replaced by a 20 MVA transformer. Additional three feeders will be installed together with transformer protection and auxiliary power equipment.

3-Fundis Cross 66/33 kV Substation

18. This is a 66/33kV, 7.5 MVA substation which is currently fed from one 66kV incomer from Mapanga substation. The substation has 3 x 33kV feeders supplying Mulanje, Thyolo and Phalombe districts. Since the 7.5MVA transformer currently installed is overloaded, the transformer cannot meet the growing electricity demand in the area. There originally was a 12.5MVA transformer that developed a fault and was temporarily replaced by the current 7.5 MVA equipment. In addition, the substation does not have a control room. Moreover, the substation has old oil-type circuit-breakers, and an old electromechanical relay providing protection.

19. To bring the substation up to normal substation standard, this project entails the upgrading of a transformer capacity from the existing 7.5MVA to 15MVA to cater for the increasing load demand in this important tea-growing area. In addition, existing oil-type circuit breakers, transformer protection and on load tap changer panels and auto-reclosers need to be replaced together with the refurbishment of the 33 kV busbar system. A new control room will be built to house all protection and control panels. Space is available within the substation perimeter for a new control building.

4-Nkula 66/33 kV substation

20. Nkula 66/33/11 kV substation is located at Nkula power station. The substation is supplied from nearby Nkula 132/66 kV substation through a 66 kV overhead line. Nkula substation has two transformation sections, 66/11kV and 11/33kV step-up. The 66/11 kV section has two 12.5 MVA transformers and the 11/33kV section has one 5 MVA transformer. The rehabilitation covers uprating of 11/33kV step-up transformer to a step-down 66/33 kV transformer, consequently establishing a new 66/33 kV, 15 MVA substation with the 33 kV line split into three dedicated outgoing lines connecting to Mwanza, Chileka and Balaka. In addition, oil-type circuit breakers, which are old and obsolete, and old electro-mechanical protection relays at the 11 kV indoor switchgear panels need to be upgraded with new panels that can operate with SCADA systems.

5-Balaka 66/33/11 kV & Chingeni 66/33 kV

21. This project entails converting the current 66/11kV substation at Balaka to a 33/11kV substation and building a new 66/33kV substation at the existing Chingeni switching station site. The new substation at Chingeni will thus supply the 33kV network around the area. The intention to convert Balaka substation into a 33/11kV substation is to provide a localized supply for the areas around Balaka and interconnect it with Chingeni and Liwonde (about 15km away). This would result

in a reduced loading on the 33kV line which extends as far as Golomoti (about 100km away). This project thus requires establishment of a 66/33kV, 15 MVA substation at the existing Chingeni site, conversion of all 11/0.4kV distribution transformers along the Balaka–Chingeni–Ntcheu link to 33/0.4kV, replacement of the Balaka substation transformer with a 5MVA 33/11kV transformer and construction of a 33kV line from Balaka to Liwonde to interconnect with the existing 33kV system in Liwonde.

Sub component 1A.3: Construction of new 33 kV & 11 kV Distribution lines & Installation of Capacitor Banks

22. With regard to the distribution line activities listed below, the project appraisal process has finalised the technical requirements, including the starting and end points of the lines. However, the precise line routes to be followed can only be determined by the detailed engineering design work that will be undertaken by the contractors during project implementation.

1-33 kV Karonga-Mzuzu road OHL

23. Karonga substation (66/33 kV) has only one 33 kV outgoing feeder bay for Chitipa and Songwe lines both of which are long and which need to be split to enhance operational flexibility and fault discrimination. This 33 kV single circuit overhead line will be installed with ACSR dog (100 mm^2) type of conductor. Wood poles are the dominant types of construction for ESCOM's 33 kV distribution system, as these are the most cost-effective and suitable solution in Malawi.

2-33 kV Luwinga-T/hill- Mzuzu OHL

24. This line would be an upgrade of a single circuit, from 50 mm^2 AAAC to ACSR dog conductor (100 mm^2) and wood pole. The upgrading would tie three existing substations.

3-11 kV Luwinga- Choma Poultry OHL

25. A new 11 kV overhead line is required from Luwinga Substation to Choma Poultry, to interconnect with an existing feeder from Mzuzu Substation to increase operational flexibility and reliability of supply in Mzuzu and Luwinga areas, which are new developments expected in the area including a new university campus. A 185 mm2 XLPE cable is required to feed this line to a pole about 300 meter from Luwinga substation and the line would be a ACSR dog type of conductor with wood poles.

4-11 kV FMB- Kaningina OHL

26. This line route would be up-rated from 50 mm^2 to 100 mm^2 (ACSR dog conductor) with wood poles. The line is required to increase operational flexibility and reliability of supply in Mzuzu and Luwinga areas. It runs from Mzuzu water works through Kaningina Township to the city center. A 185 mm^2 XLPE underground cable is required from gymnasium through FMB substation since the route is not suitable for overhead line.

5-Bangwe205- Nguludi OHL

27. This new ACSR dog conductor wood pole 33kV line will be constructed to provide the source of supply for new Bangwe Substation for improved reliability, better quality of supply and operational flexibility of the distribution system.

6-Chigumula 105- Bangwe 105 OHL

28. This new 33kV line would be constructed as an integral part of the new Bangwe substation, which is geographically and electrically far away from the main supply substation at Limbe A and experiencing electrical load growth from building construction activities. Bangwe is a growing load centre and is not adequately supplied from Limbe A substation, which lacks sufficient supply capacity via the existing 11kV distribution network. The line would be constructed using ACSR dog conductor with wood poles.

7-Mapanga – Chiladzulu OHL

29. This 33 kV wood-pole overhead line would facilitate the connection from Mapanga substation to Chiladzulu Turn off line via a dedicated 33 kV bay. The work is associated with a spur line off the Mapanga Mulanje 33kV line. The T-off is located approximately 1.4km away from Mapanga substation. A separate 33kV feeder bay is required at Mapanga substation in order to split these two lines and supply the (present) spur line through a dedicated 33 kV feeder bay. The feeder bay would be equipped with an auto-recloser and an isolator.

8-Capacitor Banks

30. Due to the growing economy, the demand for electricity has risen over the past few years without a corresponding expansion of the power generation system. Several of the currently operating power stations need rehabilitation. As a result, the existing system is greatly strained, and the frequency of blackouts or brownouts is increasing. Therefore, the capacitor bank installations on the distribution system will help to increase the system power factor (to reduce reactive power in the system) and, as a consequence, they reduce the system technical losses, improve the voltage regulation and avoid overloading of circuits. ESCOM conducted reactive power compensation study using load flow software tools that revealed the need for capacitive compensation. The project will finance the capacitor banks associated with the following bank financed substations: Katoto, New Dwangwa, Kauma, Bangwe and Limbe A. In terms of actual location, the capacitor banks will be pole-mounted at sites closer to the actual loads. The precise locations will only be determined during the detailed engineering design phase of the project.

Sub component 1A.4 Rehabilitate 33 kV Distribution Lines

Chichiri 105- Customs 205 OHL(4 km long, wood pole ACSR Wolf) **and** *Chileka 305- Mapanga 505 OHL (17 km long, wood pole ACSR Wolf)*

31. Blantyre city is fed by a 33 kV ring between Chichiri and Mapanga which are connected to 33/11 kV substations at Customs, Michiru, Chirimba and Chileka. However, the 33 kV network is heavily loaded and does not provide a level of flexibility needed for safe load transfer within the

sections of the ring. Therefore, uprating the existing 100mm^2 overhead lines, between the sections of the ring, to 175 mm^2 ensures adequate load transfer capacity in the ring.

32. For this proposed distribution line rehabilitation, the sites for project activities are known as these distribution lines already exist. However, the activity entails only the replacement of existing electricity lines with higher capacity lines. No environmental or social impacts are expected from this activity. Nevertheless, the ESMF prepared for the project provides a comprehensive framework to cover all eventualities during project implementation.[23]

Sub component 1A.5: Rehabilitation of Underground Cables

33. These cables are part of 11kV feeder system from Customs, Blantyre Main, and Queen's Substations. Over the years these cables have become unreliable due to damage caused by construction works along their routes. In order to ensure reliability of supply to Blantyre city center and areas surrounding Queens Elizabeth hospital, the replacement of these cables is essential. The replacement cable type will be185 mm^2 copper XLPE.

34. For this proposed underground cable rehabilitation, the sites for project activities are known as these cables already exist. However, the activity entails only the replacement of the existing damaged cables. No environmental or social impacts are expected from this activity. Nevertheless, the ESMF prepared for the project provides a comprehensive framework to cover all eventualities during project implementation.[24]

Sub component 1A.6 Extension of the Peri Urban Network

35. Currently, only about 7 percent of the population has access to electricity. This is largely on account of (i) insufficient capacity to generate and distribute enough electricity, and (ii) severe cashflow constraints at ESCOM, preventing the acquisition of the supplies needed for household connections.

36. Migration to major towns has led to the rapid growth of peri-urban areas. Twenty-two city peri-urban neighbourhoods have been identified for network extension. Electricity access in these areas is limited to a few low-capacity and over-extended LV lines, resulting in high technical loss rates for the very limited number of connections served. Most peri-urban project sites are housing plots within the cities of Blantyre, Lilongwe, Zomba and Mzuzu consisting of low to medium-density type housing. Most of the areas are presently undergoing very rapid residential construction development with some constructions already completed and awaiting electrical service connections. Extending primary MV lines (including distribution transformers) and secondary LV lines into these areas would allow ESCOM to substantially ramp up household connection rates in these areas in a technically and economically efficient manner.

37. The consumption in these areas range from 1.5kW to 4kW, for medium to high income groups that require most household appliances, and approximately 0.5kW on average for low income groups within traditional housing plots. The selected project areas are, in general, well served with

[23] In addition, as set out in the ESMF, the contractor will be required to prepare and implement an Environmental & Social Management Plan, which will specify measures to manage and mitigate any environmental issues.
[24] As above.

medium voltage line infrastructure such that provision of additional transformer capacity will not require construction of costly long medium-voltage lines into the areas. Single phase connections under ESCOM's 'Namagetsi' price scheme are charged a capital cost charge of 27,000 kwacha (approximately US$180), connection fee (1,500 kwacha, approximately US$10), and an inspection fee (200 kwacha, approximately US$1.5).

38. Since city peri-urban sites have relatively lower housing densities, 11kV lines are proposed in order to connect to the existing 11kV networks. 33kV lines are proposed only where such networks are in place. Aluminum Conductor Steel Reinforced (ACSR) Rabbit conductor, ESCOM design standard, is selected for MV spur lines. The proposed distribution substation design is a pole-mounted transformer to save costs and minimize Right-of-Way (ROW) requirements. The LV system would be 95mm2 (a relatively large size to cater for promising future growth) copper Aerial Bundled Conductors (ABC), installed on wood poles. Anti-climbing devices and warning signs would be erected to deter theft and vandalism. The new household connections will be fitted with Pre-Paid Meters to ensure high collection rates for these new customers, as well as efficient cash flow for ESCOM, and minimize risks of payment arrears or fraudulent bill collection patterns.

39. For this proposed set of activities, the high-priority neighbourhoods where the works would occur have been identified during the appraisal process. However, the precise line routes to be followed by the 11kV lines and the routes of the low-voltage reticulation lines to individual households can only be determined by the detailed engineering design work that will be undertaken by the contractors during project implementation.

40. This limited extension of the peri-urban network via approximately **6,000** new household connections will benefit approximately **27,000** Malawians.[25]

Sub component 1A.7: Acquisition of Generation Spare Parts

41. To increase the hydro generation plants efficiency the Bank will finance spare parts for Kapichira, Nkula B and Tedzani I, II and III power stations.

42. **Kapichira power station**: Turbine needs to be repaired since turbine underwater parts have worn out due to excessive abrasion caused by poor water condition because of silted-up reservoir. In addition, spare parts of main inlet and hydraulic governor are out of stock due to insufficient financial resources.

43. **Nkula B power station:** Some turbine parts were damaged due to flooding. In addition, the units 6, 7 and 8 are required rehabilitation. Due to inadequate internal funding spare parts are out of stock.

44. **Tedzani I, II and III power stations:** Generator coolers are badly damage and isolated due to leakages; winding and excitation equipment of the generator were damaged due short circuit. In addition, turbine has not been overhauled since 15 years (although the recommended general repair is 10 years) due to insufficient internal funding for the spare parts.

[25] Assuming an average household size of 4.5 in the project areas for this activity.

Component 1a Summary

Sub component	Projects	Estimated cost (US$ million) (including contingencies)
1.A. 1	New Substations & Associated Lines	13.3
1.A.2	Uprating Existing Substations	15.5
1.A.3	New 33 kV and 11 kV Distribution lines and Capacitor Banks	2.1
1.A.4	Rehabilitate 33 kV Distribution Lines	0.8
1.A.5	Underground Cables Rehabilitation	1.3
1.A.6	Peri-Urban Network Extension	4.7
1.A.7	Generation Spare Parts	3.8
-	Compensation Costs	0.5
TOTAL		**41.9**

COMPONENT 1B: LOW VOLTAGE RETICULATION REINFORCEMENT AND TECHNICAL IMPLEMENTATION SUPPORT (estimated at US$10.5 million, including contingencies):

Sub component 1B.1 Acquisition & installation of low-voltage reticulation goods and equipment (US$10.0 million)

45. The nature of low voltage reticulation reinforcement activities is that they are undertaken at multiple sites in the cities, primarily in those areas that have the oldest network or have experienced the greatest load growth. The precise locations will be determined by ESCOM's services following detailed survey work during project implementation.

46. Since ESCOM technician and linesmen have experience in installation of LV reticulation equipment, the project only finances the supply of goods and equipment, with the installation to be done by ESCOM's own technical services. Activities in this sub-component include: (a) reconfiguration and extension of medium voltage overhead lines (11kV and below) supplying distribution transformers (such as pole-mounted MV/LV step-down transformers), (b) installation of approximately 111 new distribution transformers (with a total capacity estimated at 19.5 MVA), (c) construction of new three-phase low voltage overhead lines and conversion of single-phase to three-phase low voltage overhead lines, and (d) supply of associated maintenance & operation tools.

47. The works shall be focused on the major cities of Blantyre, Lilongwe, Mzuzu and Zomba, where there are extensive, and relatively older, low voltage networks. In addition, associated tools and measurement equipment will be provided to effectively carry out this work. For these proposed LV reticulation activities, the project appraisal process has allowed estimates of technical requirements, such as numbers of transformers and kilometers of electrical cabling, to be made.

However, the precise locations for the installation of the new distribution transformers or the routes for the extension of the 11kV lines will only be determined by the detailed engineering planning and design work that will be undertaken during project implementation.

Sub component 1B.2 Training School for ESCOM linesman and technician (US$0.5 Million)

48. Since the LV reticulation work is technically simple and can be implemented by ESCOM's own technical services, only LV reticulation equipment and the necessary tools are financed via the project resources.[26] However, ESCOM's linesmen and technicians need to update and gain practical field experience, and improve their skills on latest techniques of LV reticulation work.

49. Therefore, ESCOM's existing Training School in Blantyre will be enhanced under the project, via a dedicated team of trainers from an international firm with experience in this type of training, to deliver a comprehensive, hand-on training program for ESCOM linesmen and other technicians in industry best-practice in all aspects of LV reticulation strengthening expansion. The focus will be on (i) training existing linesmen, rather than training new staff from the beginning, and (ii) on "training the trainers", who are more experienced ESCOM technicians, to ensure that the new techniques are taught to future technicians.

50. The training is supported by computer-based training programs, which can be modular in design and provide a learning and a testing/assessment output, to meet the specific needs of the work. In addition, supporting documentation is provided with all programs and a full maintenance and updating service to be provided throughout the project implementation period.

51. The training school will include the following:

- Introduction to safe pole climbing and pole top rescue,11kV OH Lines Construction, LV Aerial Bundled Conductor Erection, LV System Live Working
- Laying, jointing techniques, fault finding, cable identification and commissioning of 33 kV and 11kV underground cable, in ESCOM system, in both dead and, where appropriate, live conditions.
- Fitting of transformer and substation and electrical operations such as: testing, inspection, maintenance, earthing, panel wiring, working at height, basic operational safety, electrical working parties, access to substations, LV system operations, 11kV switchgear familiarization, overhead and ground mounted 11kV switching, connection and operations of transformers, basic and advanced protection systems, fault finding, and cable identification.
- Installation including wiring, testing, and commissioning of all types of metering.
- Assistance in developing the basic distribution system expansion tools and metering equipment and skills required to maintain the system operation and marginal day to day expansion.
- Emergency First Aid, moving & handling and simulated incident sessions.

52. In addition, the Training School will offer training on design principles of LV reticulation and improve the capacity for ESCOM's technical services to design small-scale system expansion.

[26] ESCOM's internal procedures currently state that activities exceeding a certain scale are generally outsourced to external contractors. In implementation of Component 1b, ESCOM management will review each individual activity and decided whether the optimal approach is to proceed using ESCOM staff or to engage an external contractor. Any external contractor costs would be financed entirely by ESCOM.

As part of this, the Training School will provide practical, hands-on training for ESCOM staff on simple computer models for LV system expansion, using commercially available packages. This shall be based on real or projected loads associated with the households and shall establish the LV and MV network to serve these new areas with a view of a 5 and 10 year minimum cost system growth. For areas already partially electrified a similar model should be establish to assess the additional system extension required to serve these areas properly.

COMPONENT 1.C DESIGN, PROCUREMENT & SUPERVISION (estimated at US$ 3.8 million, including contingencies):

53. ESCOM will use turnkey Supply and Installation (S&I) procurement procedures for construction and rehabilitation of the activities listed in Component 1a, via multiple packages. A large set of goods will also be procured for Component 1b. Procuring and supervising several multi-million dollar S&I contracts is a challenging task. In order to smoothly implement the project, ESCOM will procure a Consulting Engineering with international experience in design and construction of T&D projects.

54. The Consulting Engineer would be recruited on the basis of a two-phase contract :

- **Preparation:**

- Preliminary survey and design work and technical specifications for T&D investments in Component 1a
- Preparation of the Bid Documents for Components 1a and 1b activities
- Support in all stages of the procurement process for the main contracts for Components 1a and 1b, including assisting ESCOM in contract negotiations and preparation of final contract documents

- **Implementation:**

- Support to ESCOM to supervise contractors during implementation of Component 1a, including on safeguards issues.
- Advise ESCOM on establishing a dedicated materials management system for the goods to be procured by ESCOM under Component 1b, to run alongside ESCOM's existing main system.[27] The consultant would also carry out regular independent audits of the materials management system, on behalf of ESCOM management.
- Play an independent verification / 'due diligence' role in Component 1b, to provide assurance to ESCOM management and the WB that works are proceeding correctly.

55. In addition, the consultant will also provide support and training to ESCOM's technical services, including: (a) technical guidance to assist ESCOM in undertaking 'technical loss audits' aimed at determining key sources of losses in the low-voltage system., (b) revision of technical codes of practice and design/implementation manuals, (c) advice on materials and supply such as equipment standardisation to minimize overall business operation costs, and (d) guidance on development of utility reliability indices such SAIDI and SAIFI for measuring performance. The Consulting Engineer will also support ESCOM in the preparation of transmission and distribution system design principles, supply quality conditions and operational principles concerning the

[27] A similar dedicated materials management system is in place for MAREP. The consulting engineer would advise on implementation structure, inventory management system, manpower and schedules. It would cover both the spare parts to be supplied in Component 1a and the goods for LV reticulation to be supplied in Component 1b. This system would need to be operational prior to delivery of the goods.

transmission and distribution systems, and rules and procedures for generation facility switchyards design to be complied with by ESCOM and transmission system users.

COMPONENT 2: GENERATION & TRANSMISSION FEASIBILITY STUDIES (estimated at US$15.2 million, including contingencies).

56. This component includes financing for feasibility studies needed for eventual development of an additional 200–380 MW of new hydropower generation capacity in Malawi, as well as for a pre-feasibility study for a new transmission 'backbone' needed for further growth of the Malawian grid. The feasibility studies will include technical & economic assessments and ESIAs (at either preliminary or full level, depending on the site), and development of the necessary environmental and social mitigation/management plans (again at either preliminary or full level, depending on the site). For the generation feasibility studies, social safeguards aspects of the studies will include a social assessment both at the location of the site and in upstream areas to help determine the social impact in terms of possible displacement and land acquisition necessary for project development. The findings will be used to determine the scope of the potential social impacts that the development of the site will cause.

57. The generation feasibility studies will include investigation of up to two sites with potential capacity of over 100MW on the major rivers in Malawi (**Lower Fufu** on the South Rukuru river and **Mpatamanga** on the Shire river), as well as one site with less than 50 MW potential capacity on a tributary river (**Chimgonda** on the Dwambazi River). The spread of the feasibility studies by size and geography will allow for a diversification of the sources of water for hydropower generation to mitigate some of the hydrologic risks of the already-crowded Shire river system. This approach will also allow for preparation of a range of projects suitable for future public, private, and hybrid financing. A full ESIA and Resettlement Action Plan (RAP) will only be prepared for the Lower Fufu Hydropower site.

58. The details of the various proposed sites are as follows:

- **Lower Fufu** is a high-head (over 300 m) run-of-the-river site with potential to utilize the South Rukuru River and, through a connector, the North Rumphi River flows, for a generation capacity range of 90 – 180MW. This site can make a major contribution to generation in the northern part of the country and, with reinforced evacuation capacity to the south, also to the rest of Malawi. MoNREE has prepared a draft Terms of Reference for the study, which has been reviewed by the World Bank. The feasibility study for this site will build on the existing pre-feasibility study and will include full technical, environmental, social, and economic aspects. The study will be split into two separate parts, with two independent contracts. The technical aspects will be carried out to the level of full project engineering design and will be accompanied by a comprehensive economic analysis. A draft ToR for this aspect has been prepared and discussed.

59. It is likely that the first phase of the feasibility study will recommend construction of a diversion dam and intake structure as part of the design of the hydropower facility. Because there can be grave consequences if a dam does not function properly or fails, the World Bank takes dam safety concerns seriously and will always promote best practice in the design of new dams, as well as during all later stages of project development that might follow. To this end, in any second phase of detailed engineering design that covers dam design, it will be necessary to hire under the project a separate and independent expert (or group of experts) to review the quality of the studies and designs

being undertaken by the main consultant, in order to guarantee that they reflect international best practice and standards with respect to dam safety.

60. Separately, a full Environmental and Social Impact Assessment (ESIA), comprising independent environmental & social impact analyses and associated mitigation/management plan and the preparation of a Resettlement Action Plan (RAP), will be carried out by an independent contractor. The two studies will be closely coordinated and be prepared in parallel. The objective will be to complete this technical study and the full ESIA and RAP to the point that the entire project is ready to move directly to the financing stage. Estimated study cost for this site, for both parts, is US$6.3 million, including contingencies.

- **Mpatamanga** is a medium head (50-60 m) storage site located on the Middle Shire River. The capacity of this site is limited by the virtue of the presence of other hydropower storage facilities on the Shire River. The optimum capacity at this site is approximately 100-150 MW due to tailrace considerations for Tedzani III, located upstream. However, improvements in the management of water flows out of Lake Malawi could potentially increase the potential capacity of the site considerably. The feasibility study at this site will consist of an integrated technical & economic assessment plus a preliminary ESIA. A draft ToR has been prepared and discussed. The technical aspects will be carried out to the level of preliminary project engineering design. As with Lower Fufu, in the event that the part of the ToR that covers preliminary engineering design includes preliminary design of a dam, it will also be necessary to have independent review with regard to dam safety aspects of the project. The same separate and independent expert (s) would review the quality of the studies being undertaken by the main consultant to ensure that international dam safety best practice and standards are incorporated.

61. The ESIA will be carried out at the preliminary level, rather than the full impact assessment, and will be part of the cumulative impact section of the overall feasibility study, rather than as a standalone study. The study will also estimate the number of Project Affected People (PAPs). Should this site prove feasible for development, full engineering design and a full ESIA (including associated environmental & social mitigation/management plan) would have to be carried out in the future. Estimated study cost for this site is US$3.6 million, including contingencies

- The smaller **Chimgonda site** on the Dwambazi River, as reviewed via existing reports and satellite imagery, appears to be suitable for a feasibility study through this project. The capacity at this site is estimated at 20-50MW. A draft ToR has been prepared and discussed. As with the Mpatamanga site, the feasibility study will consist of an integrated technical & economic assessment plus a preliminary ESIA, and an estimate will be made of the number of PAPs. The technical aspects will be carried out to the level of preliminary project engineering design and the ESIA at preliminary level. And as with the other two sites, in the event that the part of the ToR that covers preliminary engineering design includes preliminary design of a dam, it will also be necessary to have independent review with regard to dam safety. The same separate and independent expert (s) would review the quality of the studies being undertaken by the main consultant to ensure that international dam safety best practice and standards are incorporated. Estimated study cost for this site is US$2.4 million, including contingencies.

62. The estimated cost for the independent expert (or group of experts) overseeing the quality of the three hydropower studies from a dam safety best practice perspective is US$0.3 million.

63. **Environmental and Social Advisory Panel** In addition, an Environmental and Social Advisory Panel (ESAP), consisting of one environmental expert and one resettlement expert, will be

established to review the TOR, full ESIA, RAP and other safeguard documents and advise on safeguard aspects for the Lower Fufu Hydro Power Plant. The ESAP will also review and advise on the safeguard aspects of the two other proposed dam sites and the on the preliminary selection of the Right of Way for the Transmission Backbone. The cost for a two year contract for the ESAP is estimated at US$160,000.

64. It is underlined that no physical investments or preparations will be undertaken at any of the proposed sites as part of the project. Preliminary environmental and social investigation of the sites was undertaken during project preparation, consisting of site visits, desk reviews of existing reports and pre-feasibility studies, analysis of satellite imagery reconnaissance and preliminary modelling of areas to be inundated. This technical analysis was complemented by discussion with knowledgeable staff in the MoNREE and Department of Water Resources staff, as well as ESCOM personnel. These preliminary assessments indicate that no major adverse social and environmental impacts are expected from the eventual development of these sites that would *a priori* prevent these sites from being considered for a feasibility study (i.e. there would be limited, if any, displacement and/or acquisition of land used for livestock and agricultural activities). Moreover, none of the sites selected for studies are located in nature reserves, protected areas or other areas of environmental sensitivity or high biodiversity, and the preliminary indications are that physical resettlement requirements would be minimal.

65. Once the studies are completed and if proven feasible, the least-cost priority sequence of eventual development of the sites studied will be confirmed by the update of the Malawi power sector Master Plan that is currently underway.

66. **Transmission system.** Over the medium term, there is a need to further expand Malawi's transmission system. Even with MCC support to strengthen the transmission grid north of Lilongwe (i.e. uprating parts of the existing line along the Lake Malawi shoreline), there will still be insufficient transmission capacity to evacuate power from the new generation sites in the north (e.g. from Lower Fufu, as discussed above) to the major load centres in the central and southern regions. In addition, the single lakeshore line currently in place implies a lack of redundancy in transmission capacity to and from the northern region. As a result, any unplanned outages or scheduled maintenance inevitably cuts off the northern region. It is proposed to include a pre-feasibility study for a new 'inland' transmission backbone line that would run north-west from Lilongwe via Kasungu to Mzuzu (approximately 350km), including line route options and the associated environmental and social impact studies at a preliminary level. Estimated cost of transmission backbone feasibility study: US$2.5 million, including contingencies.

Summary of Component 2 Costs including contingencies (US$)

Preparation of feasibility study for Lower Fufu	4,250,000
Preparation of full independent ESIA for Lower Fufu	2,000,000
Preparation of feasibility study for Mpatamanga	3,600,000
Preparation of feasibility study for Chimgonda	2,350,000
Independent dam safety panel of experts	300,000
Environmental and Social Advisory Panel (ESAP)	160,000
Preparation of feasibility study for backbone transmission line	2,520,000
	15,180,000

COMPONENT 3: DEMAND SIDE MANAGEMENT AND ENERGY EFFICIENCY MEASURES (estimated at US$6.8 million, including contingencies)

67. Given the severe capacity constraints in Malawi's power system – evidenced by the extensive and year-round load-shedding program discussed above – it is proposed to finance several demand-side management (DSM) and energy efficiency activities, focusing on reducing the coincident peak load (MW) and therefore avoiding daily black-outs. Some of those activities will also contribute to achieve energy savings (MWh). These interventions will provide, at relatively low cost, critical 'quick wins' in Malawi's efforts to close the demand-supply gap, pending the installation of new generation capacity in the medium term. They will also help Malawi manage its system more reliably and at a lower cost.

68. The proposed investments focus on Hot Water Geysers (HWGs). It is estimated that water heating load accounts for a large fraction of household energy consumption. There are about 23,000 installed electric water heaters rated from 1.5 kW to 4.5 kW. The activities will include:

- De-rating of Hot Water Geysers (HWGs) heating elements to a limit of 2.5 kW via a free replacement program of existing elements to shift load to non-peak hours and therefore reduce coincident peak load.
- Installation of HWG insulation 'blankets' via a free program to better insulate existing HWGs for reducing peak load and increase energy efficiency, with direct benefits to the customer. It is estimated that approximately 17% of the energy used in HWGs can be saved, implying also that the frequency with which HWGs switch on (via thermostats) in peak hours would be reduced by a corresponding amount. For customers with HWG heater elements with a capacity greater than 2.5kW, installation of the blanket would be a 'quid pro quo' for de-rating of the heater element.
- Wireless (radio) load control to manage HWG loads during peak hours, allowing ESCOM to remotely switch-off HWGs in given areas at given times. When implemented in combination with the insulating effects of the HWG blankets, inconvenience to households would be minimal.[28]

69. ESCOM use external contractors to implement these programs. In addition, for the detailed design and implementation supervision ESCOM will receive technical support from a supervision consultant to be hired under the project. The consultant will assist ESCOM with inspection of and sign-off on the contractors' activities.

70. A summary of the interventions and required investment costs are shown in the following table.

Activity	# Installations	Cost (US$ million, including contingencies)
De-rating of HWG heater elements	11,250	0.8
Installation of HWG insulation 'blankets'	20,000	2.2
Wireless (radio) HWG load control	17,000	3.5
DSM Supervision consultant		0.3

[28] Depending on its success, ESCOM could also consider extending the wireless load control program to other household appliances, such as electric cookers and air conditioning.

71. The expected MW peak reduction is 2.8 MW for the de-rating of HWG elements, 1.5 MW for the insulation blankets, and 8.5 MW for wireless load control. To avoid double counting, it was assumed that the overall MW reduced during peak hours is the 'one-off' load reduction from derated HWG elements plus the load to be radio controlled plus the pro-rata contribution of 3,000 HWGs where blankets were installed but load control was not made available. This will result in approximately 11 MW of load shift from peak to non-peak hours.

72. It is assumed that only the installation of insulation blankets have impact on energy savings, in terms of kWh. Each blanket is estimated to save about 17% of customer's electricity needs for water heating. These savings are valued at US$ 50/MWh which is currently the average tariff in Malawi.

73. In addition to investments to be made in energy-efficient equipment and load control, improved customer awareness is urgently needed to foster energy efficiency. In particular, sensitization of business / industrial customers to shift to time-of-use tariffs is important: significant energy savings can come from proactive efforts by ESCOM to explain to these customers their energy consumption patterns and to demonstrate savings to be obtained by shifting load to take advantage of the time-of-use tariffs that have been recently introduced. ESCOM proposes to task "Customer Relationship Managers" with advising LV/MV customers on energy efficiency and DSM. The adoption of Automatic Meter Reading (AMR) for large customers will allow them to better monitor and manage their energy consumption, hence allowing ESCOM to improve load control. Component 4 of the project provides resources for technical assistance and capacity-building activities that will allow ESCOM staff better to undertake these activities.

COMPONENT 4: CAPACITY BUILDING & TECHNICAL ASSISTANCE (estimated at US$3.5 million, including contingencies).

74. This component will provide resources for capacity building and technical assistance to both MoNREE and ESCOM to support their efforts to further develop Malawi's energy sector. It will also provide resources, in accordance with the Bank's fiduciary and other guidelines, for the implementing agencies to effectively manage and supervise the project.

75. The component will be split into two parts:

COMPONENT 4.A SUPPORT TO ESCOM (estimated at US$0.6 million, including contingencies)

76. Activities in this sub-component will include:

- Provision of necessary software and equipment to support distribution planning and training, including:
  - A set of software for distribution system simulation and analysis (including load flow analysis), including a set of three "Hardlock" keys for use in the distribution system planning process, and a comprehensive training for the use of the software to ESCOM staff.
  - Operational support, including supply of computers and projectors for internal training purposes.
- A program of activities aimed at building the capacity of the Project Management Unit at ESCOM, including training in World Bank procurement, financial and disbursement procedures,

World Bank environmental & social safeguards management, project management, energy planning, technical capacity building on generation, transmission and distribution systems, economic and financial analysis, M&E systems etc. Training-related travel expenditures and other travel-related allowances would also be financed.

- Resources for effective management and supervision of the project, consisting of:
  - Incremental operating costs – that is, incremental recurrent expenditures incurred on account of project implementation, including: vehicle operation (including fuel), maintenance and repair; office materials and supplies; media communications expenses; and expenses associated with conference rooms & facilities[29]
  - Office equipment and hardware for the PMU (computers, photocopiers, projectors, printers and scanners)
  - Necessary operational consultancy support for the PMU, including project audits, IT/systems maintenance and other short-term specialists.

77. More details about project management arrangements are given in Annex 3. The table below gives details of the main costs expected to be incurred for project Component 4A.

Component 4A: Indicative Costs for ESCOM (including contingencies)

Item	Total Estimated Cost (US$ million)
Provision of necessary software and equipment to support distribution planning and training.	0.13
Capacity-building (training)	0.15
Incremental operating costs for ESCOM PMU	0.17
Office equipment and hardware for the PMU	0.03
Necessary operational consultancy support for the PMU	0.15
TOTAL	**0.63**

COMPONENT 4.B SUPPORT TO MoNREE (estimated at US$2.9 million, including contingencies)

78. Activities in this sub-component will include:

- Specialized **technical assistance**, including studies to accelerate the exploitation of renewable energy resources in Malawi. Specifically, building on the renewable energy mapping work being financed by MCC (as discussed above), it is proposed to finance technical assistance for the following:
  - A **wind power resource study,** using primary data from anemometers (and other hardware) to be installed at key sites
  - A preliminary assessment of **geothermal** prospects (**see box below**)
  - A technical assessment of the opportunities to expand bagasse-fuelled **cogeneration capacity** from the significant sugar production operations in Malawi.
- Support for **sectoral studies** to underpin the evolving strategic agenda (energy policy, planning and pricing, renewable energy development and regulatory issues, among others). This would, inter alia, cover technical assistance on measures necessary to strengthen the institutional, legislative, regulatory and safeguards frameworks for dam safety programs, as part of Government's forward planning for the development and operation of new hydropower plants in

[29] Operating costs cannot be used to finance the salaries of officials and public servants.

Malawi. In addition, support for public outreach campaigns on energy efficiency could be considered under this general rubric.

- Support for specialist **IPP advisers** to provide financial, legal and technical advice to GoM and the regulator MERA as they begin to solicit private sector investment in the power sector, particularly to assist with negotiations on Independent Power Producer (IPP) projects and other types of private sector investment that entail significant technical complexity. This is line with the Government's energy sector policy reform agenda, as set out in the 'Letter of Intent' prepared in support of this project, described above.
- A program of activities aimed at building the capacity of the ESPS at MoNREE, including training in World Bank procurement, financial and disbursement procedures, World Bank environmental & social safeguards management, project management, energy planning, economic and financial analysis, M&E systems etc. Training-related travel expenditures and other travel-related allowances would also be financed.
- Resources for effective management and supervision of the project, consisting of:

- Incremental operating costs – that is, incremental recurrent expenditures incurred on account of project implementation, including: vehicle operation (including fuel), maintenance and repair; office materials and supplies; media communications expenses; and expenses associated with conference rooms & facilities [30]
- Equipment and hardware for the ESPS (computers, photocopiers, projectors, printers and scanners), including one utility type pick-up truck or mini-van/multi-person vehicle for team transport.
- Necessary operational consultancy support for the ESPS, including project audits, IT/systems maintenance and other short-term specialists.

Component 4B: Indicative Costs for MoNREE (including contingencies)

Item	Total Estimated Cost (US$ million)
TA for renewable energy resource studies	1.65
Support for sectoral studies & associated TA	0.32
Specialist IPP advisers	0.35
Capacity-building (training)	0.15
Incremental operating costs for ESPS	0.19
Office equipment, hardware + 1 vehicle for ESPS	0.11
Necessary operational consultancy support for ESPS	0.15
TOTAL	**2.91**

[30] Operating costs cannot be used to finance the salaries of officials and public servants.

Preliminary Assessment of Malawi's Geothermal Prospects

Due to Malawi's geological location within the Great East African Rift Valley, where both Kenya and Ethiopia are successfully generating power from geothermal resources, and the fact that some geothermal energy sources exist in form of hot springs, geothermal energy appears to be a possible alternative energy source for the country. However, Malawi has currently not enough information and data on its geothermal resources to be able to decide on whether and how to use them. This study will address this information gap.

The main objective of the assessment is to establish a database on geothermal resources for the country. This information will provide a first estimate on temperatures of the steam, its locations and a first rough estimate on costs. In detail, the project will consist of the following two phases and be concluded with a pre-feasibility study:

Phase 1, the preliminary survey, includes a first reconnaissance of a geothermal area based on a nationwide or regional study. Methods for this purpose include geological ground studies as well as satellite and airborne research. Once the potential geothermal fields are selected, pre-feasibility studies (pre-F/S) are done to explore the likelihood of the existence of a commercial geothermal reservoir and to get a first estimate of its exploitable potential. The pre-F/S also touches aspects such as the availability of the country's power market, transmission and distribution system, availability of basic infrastructure (roads, fresh water supply, communication, etc.), and environmental issues. The institutional and regulatory framework of the country would have to be studied to evaluate how difficult it will be to obtain permits and licenses for project development and operation, or to establish a Power Purchase Agreement (PPA) with the relevant utility company or other customers. The pre-F/S study will have to be refined after the next step.

The preliminary phase is important to establish the rationale and need for the project in question and at the same time to find a justification to enter into investments induced by the following phases, exploration and test drillings. Costs for this first phase can vary a lot according to the data available and the size of the area being considered for geothermal power generation. Phase 1 usually takes from several weeks up to one year to complete.

Phase 2, the exploration phase, starts as soon as the project developer, in this case the responsible public entity of Malawi, is satisfied with the results of phase 1. In total, the second phase can take up to two years, depending on the size and accessibility of the geothermal fields and the data already available. In the beginning of this phase an exploration plan is made which can include some or all of the following research methods:

- **Geochemical research:** Samples are taken from existing hot springs and analyzed. The results allow concluding to some extent about the temperature of the fluid at the depth of the reservoir and an estimation of the fluid´s origin and recharge within the geothermal reservoir.
- **Geological research**: Samples of rocks, sediments and lava can be taken either from the surface or obtained by core drilling to disclose the type of heat source and estimate its location and potential.
- **Geophysical research**: Several methods can be used to measure the conductivity or resistivity of subsurface rocks, the Transient Electro Magnetic (TEM) and the Magneto Telluric (MT) being the most commonly used today. These two methods complement each other since the MT shows results at great depth while the TEM shows results at shallow depth and resolves the telluric shift problem of the MT.

Outcome: The result of this work will be a pre-feasibility study, allowing the GoM to determine next steps for the development of geothermal resources for power generation, and if possible, other uses. Based on the results of the pre-F/S, a sequence of geothermal projects, their size, location and basic design, will be proposed.

Annex 3: Implementation Arrangements
Malawi: Energy Sector Support Project

Project Institutional and Implementation Arrangements

Project Administration Mechanisms

1. In 2010 the Government issued a directive under which all externally-supported projects would be implemented using country systems and existing PIUs would be discontinued beyond December 2011. Accordingly, the project implementation arrangements conform to the directive and have been designed to meet Government objectives of mainstreaming project implementation capacity in the beneficiary institutions and the World Bank objective's of ensuring professional, accountable and timely project implementation.

2. Following discussions during project preparation, it has been agreed with Government and ESCOM that the project will be overseen by a Project Steering Committee (PSC) comprising the Principal Secretaries (PSs) in the Energy sub-sector. The energy sub-sector falls under the Energy and Mines Sector in the sector working group (SWG) institutional set up and organisation of the Malawi Government. The SWG set up has been developed to provide a forum for negotiations, policy dialogue and agreement of plans and undertakings amongst government, development partners, civil society organisations (CSOs) and private sector which affect or are affected by the sectoral activities. The Principal Secretary of Natural Resources, Energy and Environment (MoNREE) will chair the PSC whose other members will be the PSs for Ministries of Irrigation & Water Development, Lands, Housing & Urban Development, Development Planning & International Cooperation and the Chief Executives and Financial Directors of ESCOM and MERA. Essentially, the PSC will provide strategic direction, inter-ministerial coordination and policy guidance, oversee implementation of policy decisions, endorse consolidated annual work plans and budgets, and monitor progress. It will meet on a quarterly or semi-annual basis, as required.

3. A Technical Electricity Committee (TEC) has been established to provide technical direction to the project. Members of TEC are at Director level from relevant ministries and departments in the energy sub-sector. The Director of the Energy Affairs Department chairs the TEC. Other members are the Directors responsible for technical regulation at MERA, resettlements at Ministry of Lands, Housing & Urban Development, environmental and social safeguards at Environmental Affairs Department, and the appropriate Directors at ESCOM. The TEC is also formally responsible for preparing Annual Work Plans, budgets and Progress Reports for review and approval by the PSC and for onward transmission to the World Bank. The TEC will meet regularly and frequently.

4. Day-to-day management of the project will be provided by the two implementing agencies. Component 2 (Generation & Transmission Feasibility Studies) and Component 4b (Capacity Building & Technical Assistance to MoNREE) of the project will be managed by an Energy Support Project Secretariat (ESPS) to comprise officers from MoNREE headquarters (including Policy and Planning to provide coordination services to the project, Procurement, Accounts and Audit), Energy Affairs Department and Environmental Affairs Department (particularly the Environmental and Social Safeguard Specialists), as well as a representative from Ministry of Finance. The ESPS is responsible for day to day implementation of Components 2 and 4.B of the Project, including financial and procurement management aspects. The ESPS will comprise the following officials and associated responsibilities:

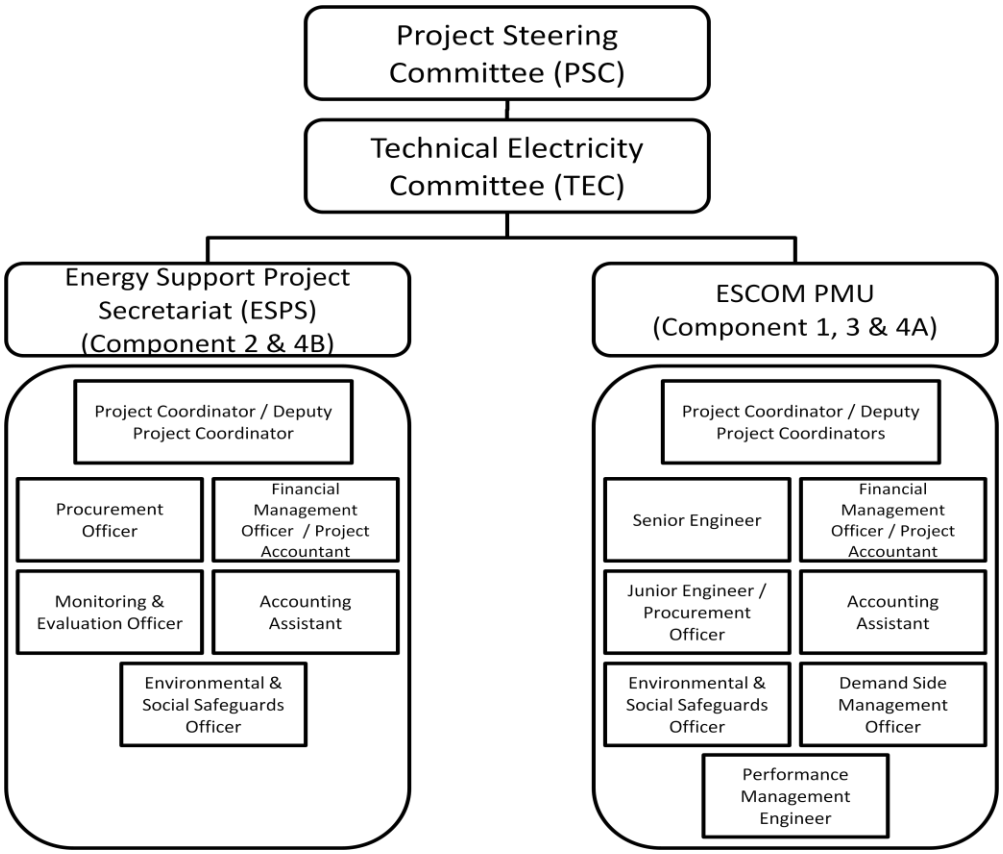
Function	Summary of Responsibilities
Project Coordinator & Deputy Project Coordinator	Coordination and supervision of project implementation and reporting to the Project Steering Committee
Procurement Officer	Conduct of all relevant project procurements in accordance with applicable guidelines
Financial Management Officer / Project Accountant	Conduct of all relevant project financial management in accordance with applicable rules and guidelines
Accounting Assistant	Maintenance of project accounts
Monitoring & Evaluation Officer	Conduct of project M&E, including reporting and measuring indicators
Environmental and Social Safeguards Officer	Monitoring of project compliance with safeguards policies

5. ESCOM will be the implementing agency for Component 1 (Electricity Network Strengthening & Expansion), Component 3 (DSM and Energy Efficiency Measures) and Component 4a (Capacity Building and Technical Assistance for ESCOM). The Government will pass on part of the proceeds of the grant and the entire credit to ESCOM to enable it to implement the activities for which it is responsible. A Subsidiary Agreement will be signed between GoM and ESCOM to this end. ESCOM has assembled a Project Management Unit (PMU), composed of the following officials:

Function	Summary of Responsibilities
Project Coordinator & Deputy Project Coordinator	Coordination and supervision of project implementation and reporting to the Project Steering Committee
Senior Engineer	Responsible for leading on all technical aspects, ensuring a high level of engineering and other technical standards are maintained during project implementation
Junior Engineer/ Procurement Officer	Conduct of all relevant project procurements in accordance with applicable guidelines, and support on technical aspects
Financial Management Officer / Project Accountant	Conduct of all relevant project financial management in accordance with applicable rules and guidelines
Accounting Assistant	Maintenance of project accounts
Performance Management Engineer	Technical inputs on measurement of system performance, including project M&E, reporting and measuring indicators.
Demand Side Management Officer	Lead on technical aspects of Component 3 (DSM and energy efficiency)
Environmental and Social Safeguards Officer	Monitoring of project compliance with safeguards policies

6. The project management structure and reporting lines are summarised in the diagram below:

Project Management Structure



7. **Annual Work Plans.** The two implementing agencies will coordinate in the areas of project and procurement planning, and the monitoring and evaluation of project outputs. Regular working sessions between the ESPS at MoNREE and the ESCOM PMU shall be held to prepare comprehensive Annual Work Plans (including detailed procurement plans), which state the activities of each component and their respective implementation schedules. . For the activities in Component 1b in particular, which will be carried out by ESCOM, the Annual Work Plans will provide details at district level on where the activities will be carried out and how they will be organized. These Annual Work Plans will be provided for review and approval to the Project Steering Committee and the World Bank.

8. **Project Implementation Manual**. In order to guide the implementation process, the implementing agencies will jointly prepare and adopt a Project Implementation Manual. This will contain detailed arrangements and procedures for: (a) institutional coordination and day-to-day execution of the Project; (b) Project budgeting, disbursement and financial management; (c) procurement; (d) monitoring, evaluation, reporting and communication; and (e) any other administrative, financial, technical and organizational arrangements and procedures that will be required. Adopting the Project Implementation Manual is a condition of project Effectiveness.

9. **Progress Reports.** The ESPS will draft, on behalf of the whole project, biannual Progress Reports on the implementation status of the project against the Annual Work Plans. The reports will review procurement and physical implementation progress, financial performance, and the progress towards achievement of the agreed results outputs and outcomes. The ESPS project co-coordinator will provide these reports to the Technical Electricity Committee for formal dissemination to the Project Steering Committee and to the World Bank. The ESCOM PMU co-coordinator will be responsible for ensuring that detailed information regarding activities implemented by ESCOM is supplied in a timely manner to the ESPS co-coordinator.

10. The two implementing agencies will receive support on environmental and social safeguards issues from their respective Environment and Social Management Units (ESMU). These two ESMUs will take the lead on safeguards-related aspects of the project. It is assessed that, with appropriate support, both ESMUs can effectively manage the low impact safeguards issues expected under the project. To that end, as part of the capacity-building support provided under the project, and as described below in the Safeguards section, both ESCOM and MoNREE will continue to strengthen their ESMUs.

Addressing Capacity Constraints

11. Experience of preparing and implementing World-Bank financed projects is limited, both in MoNREE and in ESCOM. Accordingly, Component 4 of the project will provide resources for addressing these constraints, which are identified as being primarily fiduciary (procurement and FM). Staff from the implementing agencies will be able to benefit from appropriate specialised training.

12. In addition, a one-week procurement workshop in Lilongwe tailored to the energy sector and led by a HQ-based procurement specialist was held in April 2011 in preparation for project implementation. This procurement workshop will both review general WB guidelines and procedures and also focus on case-studies to help improve implementation readiness. Procurement officers from both MoNREE and ESCOM are the target group for this workshop.

13. The main technical capacity constraint identified during project implementation has been the capacity of ESCOM technicians and linesmen to undertake the works in Component 1b (LV reticulation improvements). To address this constraint, the project will finance an enhancement of ESCOM's existing Training School in Blantyre, via a dedicated team of trainers from an international firm with experience in this type of training, to deliver a comprehensive, hand-on training program for ESCOM linesmen and other technicians in industry best-practice in all aspects of LV reticulation reinforcement.

Financial Management, Disbursements and Procurement

Financial Management

14. A Financial Management (FM) assessment of the Ministry of Natural Resources, Energy and Environment and ESCOM was conducted. Both implementing agencies will maintain a financial management system and will prepare unaudited interim financial reports (IFRs) on a quarterly basis for the activities they implement, in line with the project's covenants. MNREE will prepare a

consolidated IFR for the whole project that will be sent to the World Bank together with the two individual IFRs.

15. The objective of the assessment was to determine: (a) whether the entities have adequate FM arrangements in place to ensure the funds will be used for the purposes intended in an efficient and economical manner and that ESCOM will be capable of correctly and completely recording all transactions and balances related to the project; (b) the project's financial reports will be prepared in an accurate, reliable and timely manner; (c) the project's assets will be safely guarded; and (d) the project will be subjected to auditing arrangements acceptable to the Bank.

16. The assessment complied with the Financial Management Manual for World Bank –Financed Investment Operations that became effective on March 1, 2010 and AFTFM Financial Management Assessment and Risk Rating Principles.

17. The project Financial Management will fall under the control of both ESCOM and MoNREE. ESCOM is currently controlling all of its projects through its computerized FM system (Impact Encore), with a dedicated and well qualified personnel complement for project FM (a Chief and Project Accountant). The ESCOM project FM staff has received training and has experience in World Bank FM and disbursement requirements. MoNREE project staff will also undergo training in World Bank FM and disbursement procedures and policies. In summary, it is concluded that the basic capability to control and monitor the financial performance on projects is in place.

18. The FM risk rating summary from the assessment done is represented in the table below:

Malawi FM Risk Ratings

Risk	***Risk Rating***	***Risk Mitigating Measures Incorporated into Project Design***	***Residual risk rating***
Country Level	M	Key FM oversight elements of the project are entrusted to the Government – External Audit. Capacity for external audit is enhanced by the use of private sector audit firms as may be needed.	M
Entity Level	M	The project will mostly be implemented by an existing public sector agency, ESCOM, which is familiar with stringent governance, control and oversight requirements. Implementation will further come under scrutiny of the government, private sector and civil society.	M
Project Level	M	The project FM functions are centralized and further supported by existing project FM personnel, experienced and familiar with the Government and Bank requirements in this regard. MoNREE FM staff will be trained in WB procedures.	M
Budgeting	L	The project will be fully integrated into the activities and FM system of ESCOM. An overall framework and system for budget development exists.	L
Accounting	L	FM services are managed by a professionally qualified accountant. The project will use a computerized FM system, supported by a Financial Procedures Manual.	L

Risk	*Risk Rating*	*Risk Mitigating Measures Incorporated into Project Design*	*Residual risk rating*
Internal Control	M	Internal control is strengthened by using trained staff, proper FM procedure manuals, processes and systems and also by deployment of independent internal audit services to test the effectiveness of the control system.	M
Funds Flow	M	Project funding will be advanced through a US$ Designated Account held at the Reserve Bank and an operating account at a commercial bank as agreed by IDA. There will be one of each type of account for ESCOM and MoNREE respectively. Quarterly monitoring of this arrangement will be done via IFRs.	M
Financial Reporting	L	A computerized FM system, supported by a Financial Procedures Manual and compliant to generally accepted accounting practice, is in use to support project implementation in ESCOM. Monthly, quarterly and annual reports will be prepared to allow monitoring of project implementation.	L
Auditing	M	Internal audit services are to be provided under the auspices of the ESCOM Audit Committee. An external auditor will be engaged by the Auditor-general to carry out an annual independent audit of the project financial statements.	M
Overall FM Risk Rating	M	The overall FM risk is considered **moderate**; the inherent risks are offset by (a) professional FM staff experienced with projects; (b) a robust internal control system, which allows for segregation of functions; and independent internal and external audit; and (c) sound financial procedures and systems.	M

H-High **S**-Substantial **M**-Moderate **L**-Low

19. **Strengths.** The use of ESCOM's existing project FM staff and FM system is a significant strength to the project. ESCOM and the Bank will agree on the format of interim unaudited financial reports.

20. **Standard financial covenants** included in the Financing Agreement are the following:

- GoM and ESCOM shall maintain or cause to be maintained a financial management system in accordance with the provisions of Section 4.09 of the General Conditions.
- GoM shall have the project's Financial Statements audited, covering all project components. Each audit of the Financial Statements shall cover the period of one fiscal year of GoM. The audited Financial Statements for each such period shall be furnished to the Association not later than six months after the end of such period.
- GoM will prepare and furnish to the Association not later than forty five (45) days after the end of each calendar quarter, interim unaudited financial reports for the Project covering the quarter and covering all project components, in form and substance satisfactory to the Association.
- ESCOM shall have its corporate financial statements audited by independent auditors acceptable to the Association, in accordance with consistently applied auditing standards acceptable to the Association. Each audit of these financial statements shall cover the period of

one fiscal year of ESCOM. ESCOM shall ensure that the audited financial statements for each period shall be: (a) furnished to GoM and the Association not later than six months after the end of the period; and (b) made publicly available in a timely fashion and in a manner acceptable to the Association.

21. **Budgeting**. Cash budget preparation for the project work plan will follow ESCOM's budget standards and timetable. At a minimum an annual cash budget for the life of the project at each level of implementation will be prepared, by the responsible implementing unit. The annual cash budget will be broken down quarterly and monthly, in support of project activities as reflected in the approved work plan and procurement plan. MoNREE will show project funds as a one line item in its budget.

22. Internal Control and Internal Auditing. Internal control comprises the whole system of control, financial or otherwise, established by ESCOM and MoNREE in order to (i) carry out the project activities in an orderly and efficient manner; (ii) ensure adherence to policies and procedures; (iii) to safeguard the assets of the project; and (iv) secure as far as possible the completeness and accuracy of the financial and other records.

23. The key elements to ensure a sound internal control system will include: Segregation of duties, Physical control of assets, Authorization and approval, Clear channels of command, Arithmetic and accounting accuracy, Integrity and performance of staff at all levels, Supervision.

24. Project activities will also be periodically reviewed by the Internal Audit Department of ESCOM and Central Internal Audit for MoNREE. The Chief Internal Auditor and staff of ESCOM Internal Audit Department are qualified, an audit approach has been established and they regularly prepare internal audit reports under their mandate that are submitted to ESCOM's Audit Committee. Copies of the internal audit reports are also to be submitted to the Central Internal Audit Department of the Ministry of Finance.

25. **Accounting**. Project accounts will be maintained on a cash basis, based on IAS GAAP applicable to ESCOM. Accounting records will be maintained in Kwacha, using ESCOM's normal computerized accounting system, but with transactions of the project separately identifiable through appropriate changes to ESCOM's Chart of Accounts. The opening and closing balances of the US$ DA and of any other bank accounts relating to the project that are held in a currency different from the books of account, should be translated at the rate ruling on the opening and closing dates, respectively. Expenditures made out of the DA (and other bank accounts as mentioned above) should be stated at the rate ruling on the transaction dates. The actual exchange rates used should be disclosed in a note to the financial reports.

26. The Chart of Accounts will facilitate the preparation of relevant monthly, quarterly and annual financial statements, including information on the following: Total project expenditures, Total financial contribution from each financier, Total expenditure on each project component/activity, Analysis of that total expenditure into the disbursement categories of the project, which would include goods, works, consultants' services and operating costs. All accounting and control procedures will be documented in a FPM and regularly updated by the Project Accountant.

Financial Reporting and Monitoring

27. Minimum requirements for Interim Financial Reports (quarterly) and Annual Financial Statements are outlined below.

(i) *Statement of Sources and Uses of Funds,* showing by funding source for the period and cumulatively (project life or year to date) inflows and outflows by project component and disbursement category, as well as opening and closing cash balances of the project;

(ii) *Bank Reconciliation Statement* for each bank account, including copies of the respective bank statements

(iii) *Statement of Expenditure,* an itemized statement summarizing eligible expenditures incurred during a stated period based on individual transactions. The expenditures are normally grouped by project components and disbursement categories, comparing actual and budgeted expenditures. The report will also include a cash flow forecast for the following two quarters.

(iv) *Payments made during the reporting period against contracts subject to the Bank's prior review,* summarizing contract payments

(v) *Designated Account Reconciliation,* showing deposits and replenishments received, payments supported by withdrawal applications, interest earned on the account and the balance at the end of the reporting period.

(vi) *Procurement Reports*, which provide information on the procurement of goods, works, and consultants and on compliance with agreed procurement methods. The reports will compare procurement performance against the plan agreed at negotiations or subsequently updated, and highlight key procurement issues such as staffing and building borrower capacity.

(vii) *Physical Progress Reports,* which include narrative information and output indicators (agreed during project preparation), linking financial information with physical progress and highlighting issues that require attention.

28. Indicative formats for the reports are available in a Bank guideline General formats of FMRs are contained in: "Financial Monitoring Reports for World Bank Financed projects: Guidelines for Borrowers". In addition Annual Financial Statements would need to comply with relevant International Accounting Standards (IFRS) applicable to ESCOM.

29. Quarterly and annual reports are to be submitted respectively to – (i) the Accountant-general; (ii) the Auditor-general; (iii) IDA - for the purpose of monitoring project implementation; (iv) the Project Steering Committee to ensure transparency in project activities and implementation to all stakeholders.

30. **External Audit**. The IDA Financing Agreement will require the submission of audited Annual Financial Statements for the project within six months after year-end. The financial statements prepared, on a cash basis, for the external auditors will have the cumulative data for the year for each project implementing agency duly consolidated into a single report by MoNREE. Relevantly qualified, experienced and independent external auditors will be appointed by the Auditor-general, based on ToRs acceptable to IDA. Besides expressing an opinion on the Annual Financial Statements in compliance with International Standards on Auditing (ISAs), the auditors will be required to form an opinion on the degree of compliance with IDA procedures for the Designated Account and the balance therein at the year-end. In addition to the audit report, the external auditors will be expected to prepare a Management Letter giving observations and comments, and providing recommendations for improvements in accounting records, systems, controls and compliance with financial covenants in the IDA agreement.

31. **FM Supervision**. The first FM review will be carried out after 6 months of project effectiveness. This detailed review will cover all aspects of FM, internal control systems, reviewing the overall fiduciary control environment and tracing transactions from the bidding process to disbursements as well as SOE review.

Funds Flow and Disbursement Arrangements

32. The Government of Malawi will authorize ESCOM and MoNREE to open the following bank accounts:

(i) For each implementing agency, one US$ Designated Account (DA) opened at any commercial bank at the choice of ESCOM / MoNREE (but acceptable to IDA) **or** at the Reserve Bank of Malawi under terms and conditions acceptable to IDA, as agreed with IDA, into which project funds will be advanced in terms of normal IDA disbursement guidelines. Any interest on DA balances will be transferred to the Kwacha operating account in (ii) below. Normal ESCOM / MoNREE bank account signatory arrangements will apply to the project bank accounts.

(ii) For each implementing agency, one IDA General Operating Bank Account in Kwacha, opened at any commercial bank at the choice of ESCOM / MoNREE (but acceptable to IDA) , into which draw-downs from the DA will be credited to fund eligible expenditures except those paid via the accounts mentioned above. Normal ESCOM / MoNREE bank account signatory arrangements will apply to the project bank accounts.

33. **Disbursement Arrangements.** Method: Reimbursements, Advances, Direct Payments and Special Commitments as per disbursement guidelines. Eligible expenditure will initially be documented through SOEs with a possibility of transitioning into documenting expenses through IFR upon satisfactory performance on FM arrangements. With regard to cash compensation payments that may be made for crop damage, land acquisition, displacement or resettlement following the approval of an abbreviated or full RAP, disbursement would be on the basis of (i) compensation packages prepared by the RAP preparation team, endorsed by a relevant Government official and signed by Project-Affected Persons, or (ii) titles of new land and structures or registration of easement agreements. When a RAP is prepared, the documents will explain in detail how this process will work, how cash will be handled, what security measures will be in place to ensure that the funds are used correctly and the necessary proofs of payment that will be required.

34. Disbursement letter: The Bank will issue a disbursement letter as part of the Financing Agreement with the recipient. The disbursement letter will set out and summarize all disbursement arrangements and procedures under the project.

35. Designated Account (DA). The ceiling for the maximum amount of the IDA financing proceeds that may be deposited in the DA, will be agreed at negotiations and reflected in the disbursement letter.

36. **Compensation Payments.** With regard to cash compensation payments that may be made for impeded access to or damage to productive assets following the approval of an abbreviated or full RAP (including, inter alia, damage to annual crops, perennial crops, crop trees and timber trees), the criterion for a cash payment would be that, as set out in detail in the RPF, a compensation package is prepared by the RAP preparation team, endorsed by a relevant Government official and signed by Project-Affected Persons (PAPs). The necessary supporting documentation, as set out in the RPF,

would be a receipt of payment signed by the PAP acknowledging payment in full, witnessed or counter-signed by a Government official and a neutral third-party observer.

37. With regard to cash payments made in relation to land acquisition following the approval of an abbreviated or full RAP (including, inter alia, land under new substations, residential / business structures, distribution transformers, land or structures under distribution lines), whether these payments are compensation for the asset or allowances to prepare new land for cultivation, as set out in the RPF, the criterion for a cash payment would also be a compensation package, as above. The necessary supporting documentation, as set out in the RPF, would be (i) titles of new land and/or structures, or registration of easement agreements, and (ii) a receipt of payment signed by the PAP acknowledging payment in full, witnessed or counter-signed by a Government official and a neutral third-party observer.

38. When a RAP is prepared, the documents will explain in detail how the compensation process will work, how cash will be handled, what security measures will be in place to ensure that the funds are used correctly and the necessary proofs of payment that will be required.

39. **Withdrawal of financing proceeds.** Withdrawal of financing proceeds to the DA will be in accordance with the World Bank Disbursement Guidelines and the disbursement letter that the Bank may issue from time to time.

40. **Taxes.** The project will incur all applicable taxes in terms of Government of Malawi legislation, but will benefit from any relevant waivers that are granted in line with that legislation. Equally, the project will, where relevant, deduct on behalf of the Government of Malawi "Withholding Taxes" from payments to foreign consultants, but provision will be made during the procurement process to notify consultants of this arrangement.

41. **Disbursement Categories.** To simplify disbursements and avoid recurrent amendments, there will be six main disbursement categories, one for each project component (with two for Component 4, which has two implementing agencies), a separate category for Compensation Payments, plus a separate category for the Project Preparation Advance (PPA). However, there will be a separate reporting for each relevant procurement type (Goods, Works, Non-Consulting Services, Consultants, Training, Operating Costs) in the procurement annex of the quarterly IFR.

42. The costs attached to all activities described above are estimates that include appropriate contingencies, but any given cost estimate could be exceeded during implementation. There could also be other activities that are part of the scope of the activities set out in this document but not foreseen at the current time. These activities and the additional amount of the activities occasioned by higher than expected costs or by inflation or exchange rates would hence be taken care of through the unallocated funds.

43. The following table specifies the Categories of Eligible Expenditures that may be financed out of the proceeds of the Financing ("Category"), a description of procurement types in each Category, the allocations of the amounts of the Financing to each Category and the percentage of expenditures to be financed for Eligible Expenditures in each Category.

Disbursement Categories

Category	Procurement type	Amount excluding contingencies (US$ million)	% of costs eligible
1 (For Component 1)	Goods, Works, Non-Consulting Services, Training, Consultants	52.4	100%
2 (For Component 2)	Consultants	14.0	100%
3 (For Component 3)	Goods, Works, Non-Consulting Services, Consultants	6.2	100%
4 (For Component 4.A)	Goods, Consultants, Training, Operating Costs	0.6	100%
5 (For Component 4.B)	Goods, Consultants, Training Operating Costs	2.7	100%
6	Compensation payments	0.5	100%
7	PPF refinancing	3.0	100%
8	Unallocated	5.3	100%
	TOTAL	**84.7**	

Procurement

44. An assessment was carried out of the Ministry of Natural Resources, Energy and Environment (MoNREE) and Electricity Supply Corporation of Malawi (ESCOM) on their capacity to carry out the procurement to be undertaken for the implementation of the Energy Sector Project. The scope of the report focuses on the responsibilities of MoNREE and ESCOM in the implementation of the project. The assessment is meant to identify the gaps that could impede the execution of the project with a focus on the conditions surrounding the carrying out of procurement, and the risks to the reputation of the Bank as a financier. The assessment was undertaken on February 11, 2011.

45. Procurement under the Energy Sector Project will be carried out in accordance with the World Bank's "**Guidelines: Procurement under IBRD Loans and IDA Credits" dated January 2011; and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers' dated January 2011** and the provisions to be stipulated in the Legal Agreement**.** National Competitive Bidding (NCB) on the other hand will be in accordance with the Malawi Public Procurement Act which has been reviewed and found satisfactory to the Bank with a few exceptions. Procurement will be carried out by MoNREE and ESCOM. For each contract to be financed by the Project, the different procurement methods or consultant selection methods will be agreed between the Borrower and the Bank as reflected in the Procurement Plan. The Procurement Plan will be updated at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

46. The Energy Sector **Project** will inter alia finance the following contracts:

(i) Procurement of Works. Works procured under this project would include (a) Construction of four new substations and associated lines; (b) Uprating of five existing substations; (c) Construction of new 33kV & 11kV lines and installation of capacitor banks; (d) Rehabilitation of 33 kV lines; (e) Rehabilitation of underground cables; and (f) Extension of the peri-urban network. The procurement will be done using the Bank's Standard Bidding Documents (SBD) for all ICB and National SBD agreed with or satisfactory to the Bank.

(ii) Procurement of Goods. Goods procured under this project would include transformers, low voltage reticulation equipment, generation spare parts, planning tools etc. The procurement will be done using the Bank's SBD for all ICB and DC methods, and National SBD agreed with or satisfactory to the Bank for NCB.

(iii) Selection of Consultants. Consultants' services required would cover consultancies for preliminary design of the project, preparation of Bid Documents and co-ordination of the procurement process, supervision of project works, feasibility studies for new hydro power stations at Lower Fufu, Mpatamanga & Chimgonda and a backbone transmission line, technical assistance, capacity building etc. Short lists of consultants for services estimated to cost less than US$200,000 equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines.

Legal Aspects and Procurement Practices

47. Public Procurement in Malawi is governed by the Public Procurement Act of August 2003. The Act requires procurement **Regulations** to provide, inter alia, threshold for use of various procurement methods, bidding and bid evaluation procedures and contract management. The Law further establishes the Office of Director of Public Procurement (ODPP) with oversight for public procurement. The Office became operational in 2005 with the appointment of the Director and other substantive officers. The Government also established Internal Procurement Committees (IPC) and Specialized Procurement Units (SPU) in all Procuring Entities including ESCOM as the responsible bodies for procurement. Procurement Regulations and Desk Instructions have been distributed to all procuring entities. The Office of Director of Public Procurement has also established a dedicated website for sharing of information, placing of adverts and notification of awards to the general public.

48. The Office of Director of Public Procurement issued a number of standard bidding documents (SBD), the use of which is mandatory, covering works, goods, and services. The Office further issued desk instructions, **RFP** and form of contract for Consulting Services as well as request for quotations for goods, works and services. The Bank had reviewed the documents and were found to be generally consistent with Bank Guidelines and may be used under NCB procedures with due attention to some issues related to clarity of the evaluation criteria, award to the lowest evaluated responsive and qualified bidder, participation of foreign bidders, domestic preference and advocacy for artificial division of lots to promote participation of small enterprises in National Competitive Bidding and the Registration or Classification that should not be used as criteria for bidding.

Organizations, Functions and Staffing

49. **Organisation of Procurement under MoNREE.** The Procurement Unit in the Ministry Headquarters (PU) has an establishment of three posts, comprising one Principal Procurement Officer (Grade P7) post which is vacant, one Procurement Officer (Grade I) post which is filled and one Assistant Procurement Officer (Grade K) post which is also filled. The Procurement Officer currently serves as Head of Unit and in February attended a course on Bank procurement. Some other departments have their own procurement staff that originate and process all procurements and submit packages to the Ministry for approval and award of contracts by the Ministry's Internal Procurement Committee.

50. The current arrangement is that the Head of Unit reports to the Deputy Secretary who is the third in command in terms of the Ministry's hierarchy and is also the Chairperson of the Internal Procurement Committee (IPC) which awards contracts. The membership of the IPC comprises heads of all the departments of **Energy**, Forestry, Geological Survey and Climate Change and the Head of Procurement Unit is Secretary to the Committee. At the time of assessment, the Ministry was of the view that in order to (a) cope with an increasing volume and growing complexity of procurements Ministry-wide and (b) strengthen procurement performance, it must augment and consolidate procurement functions being undertaken in the Ministry, with more responsibility for the PU at Headquarters. In addition, since the Government of Malawi intends to abolish Project Implementation Units (PIUs) as from December, 2011, there will no longer be standalone PIUs and project management will be carried out using internal project secretariats. The effect of this decision is significant in general on project coordination and procurement management as no external assistance will be available to assist projects especially when they are just starting. Furthermore, since April 2010, Government has included new layers of approvals for contracts which now include Ministries of Justice, Finance, and Office of President & Cabinet. These new layers have created excessive delays up to two months in some cases. Therefore, the Ministry is exploring the possibility of adding the post of Chief Procurement Officer (Grade 5) to the establishment.

51. **Organization of Procurement under ESCOM**. ESCOM is wholly owned by the Government of Malawi and operates on a commercial basis. The current arrangements for procurement are that ESCOM uses bidding documents from the Director of Public Procurement for procurement of goods, services and non consulting services. ESCOM has its own Internal Procurement Committee which is responsible for award of contracts. However, large value contracts are approved by ESCOM's Board of Commissioners, the Director of Public Procurement and, since April 2010, further approval is required from the Ministries of Justice and Finance. The IPC is chaired by the Director of Distribution and other members include Systems Operations Manager, Generations Manager, Senior Manager Projects, Financial Controller, Procurement Manager (Secretary to IPC) and Senior Human Resources Manager - Planning, Selection & Management. The procurement section in ESCOM is headed by the Procurement Manager and has 14 members of staff out of which five positions were vacant at the time of assessment on 11 February, 2011. Most of the staff is well qualified although not familiar with World Bank guidelines and procedures. ESCOM has a procurement plan which details all the procurements that will be undertaken in a particular financial year. Investment projects are handled by two sections (i) the Planning Departments which has 10 qualified engineers and (ii) the Projects section which has 15 members of staff. Technical specifications and Terms of Reference are prepared by Planning and Projects sections.

52. **Procurement Planning**. As part of the appraisal process, ESCOM has developed a procurement plan for project implementation which **provides** for the first 18 months the basis for the

procurement of the various activities. The plan has been agreed between the Borrower and the Project Team. The Procurement Plan will be updated in agreement with the Project Team annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

53. **Monitoring/Control Systems.** The Internal Procurement Committee, which is the oversight institution for the project activities **implemented** by ESCOM, is in place and operational, with well understood and clearly defined mandates. The IPC will continue these oversight functions under the project.

54. **Capacity to Meet Reporting Requirements.** The Procurement Act requires PUs to submit to Office of Director of Public Procurement Quarterly reports on procurement undertaken. Report formats have been provided by the ODPP. Based on **ODPP** annual reports, ESCOM has been reporting procurement undertaken but results of awarded contracts are not published. The procurement plan will form the basis of ESCOM's reporting to ODPP and the Bank.

Adequacy of Capacity, Risks and Risk Mitigation

55. **MoNREE Headquarters.** The PU's staffing position needs to be strengthened by filling the vacant Principal Procurement Officer post and establishing and then filling the new Chief Procurement Officer post. Given the time it may take to **complete** this, the Ministry will have to focus on interim measures to ensure that procurement capacity is sufficient to meet procurement demands. Existing procurement staff should have their skills improved through on-the-job training, as well as attending short courses on procurement organised at ESAMI. The project's training plan will cover staff in the Planning Department who will be closely associated with the project, as it has been noted that there is limited technical capacity to support procurement in terms of preparation of the required documents, such as bid specifications and Terms of Reference.

56. The long approval process for contracts which **involves** the Ministries of Justice and Finance may have a serious impact on contract award. Delays have been experienced due to this directive in other WB-financed projects in Malawi.

57. **ESCOM.** A capacity assessment that the Bank had undertaken in 2006 under the Interconnector project noted identified weaknesses which included (i) limited exposure to Bank procedures (ii) lack of procurement planning and monitoring; (iii) opening bids at later time than stated in bidding documents; (iv) use of merit point system for determining responsiveness, in bid evaluation and determining qualifications and; (vi) lack of vendor rating/performance system. A lack of publication of awarded contracts, especially those from ESCOM's own funding has been controversial, resulting in awards to bidders with higher prices based on the Buy Malawian Campaign and a preference for local suppliers. Procurement planning was assessed as weak which resulted in delays in evaluations and award of contracts. These weaknesses still exist and need addressing. For the implementation of the project ESCOM will hire a private sector Consulting Engineer, who will assist in the design of the major supply and installation contracts, prepare bidding documents and assist in opening bids, prepare the bid evaluation reports and supervise construction and installation. The major procurement function of ESCOM under the project will therefore be to (i) prepare procurement plans and (ii) supervise the Consulting Engineer (and other consultants) for the design, procurement and supervision of the supply & installation and other contracts.

58. The key issues and risks concerning procurement for implementation of the project have been identified in 2006 and include procurement planning and monitoring, bid evaluation, procurement records management and contract management. A program of intensified and continuous procurement training is required. It is **essential** that key procurement staff in ESCOM update their skills in procurement by attending appropriate Bank Standard Procurement Courses. The corrective measures which have been agreed are shown in the table below. The overall project risk for procurement is average.

59. **Record Keeping and Filing System.** Record keeping is inadequate at the Ministry due to limited office space as documents are heaped on top of tables. At ESCOM, overall record keeping is satisfactory as documents are filed according to procurement undertaken and it is easy to access them. Furthermore ESCOM has most equipment including some software that would be required under the project.

Issues to be addressed

60. **Preparation of Bidding Documents and Terms of Reference.** Bid documents and Terms of Reference for large value contracts should be prepared and submitted to the Bank as soon as possible, to ensure that contracts can be in progress **expeditiously**. The Consulting Engineer and Training School contracts (see Components 1b and 1c above) will need to be procured first.

61. **Prior Review and Associated Thresholds under the Project.** Based on the initial assessment, all goods contracts estimated to cost US$ 500,000 **equivalent** or more will be subject to IDA review in accordance with the procedures in Appendix I of the Procurement Guidelines.

62. Consultancy contracts with firms estimated to cost US$ 200,000 equivalent or more, and consultancy contracts with individuals estimated to cost US$ 100,000 equivalent or more will be subject to IDA review in accordance with the procedures in Appendix I of the Consultant Guidelines.

63. **Use of National SBDs.** All ICB and large value contracts will use Bank standard documents. Procurement below the prior review thresholds shall be carried through National Competitive Procedures (NCB) in accordance with the Malawi **Public** Procurement Act and shall include: (i) an explicit statement to bidders of the evaluation criteria; (ii) award to the lowest evaluated responsive and qualified bidder; (iii) rejection of bids outside a range of bid values shall not be permitted; (iv) foreign bidders would not be precluded for participation in National Competitive Bidding; (v) Registration and Classification of bidders may be used for establishing bidder qualification or preparing a list for use under price comparison procedure but not as criteria for bidding; and (vi) artificial division of lots into small quantities and set aside for small and medium enterprises will not be used.

64. The overall capacity of MoNREE and ESCOM to carry out procurement activities under the proposed project is **satisfactory** and risk is **moderate.**

SUMMARY ASSESSMENT OF PROCUREMENT CAPACITY, RISK AND MITIGATION - ACTION PLAN

Overall Assessment of Risk: **Moderate** Date of the Assessment: 11 February, **2011**	GOODS: **US$500,000**	Consultancy Services Firms: **US$200,000** Individuals: **100,000**	**Actions to be taken**
Analysis of Procurement Capacity	**Issues/Risks**	**Mitigation Measures**	**By When/Who**
1. Inadequate Procurement Planning	Capacity to manage procurement issues is limited.	Prepare procurement plan for at least initial 18 months of project. Agree on service standards for processing procurement.	MREE/ ESCOM by negotiations
3. Monitoring/Control Systems	Need to introduce Contract Monitoring system ;	Establish an acceptable contract monitoring system;	MREE/ESCOM On going
4. Capacity to meet Reporting Requirements	Available staff if adequately trained can produce required reports;	No major issue.	MoNREE/ESCOM
5. No Project Implementation Manual to provide guidance	Need to introduce Project Implementation Manual to guide staff	Prepare & update Project Implementation Manual	MoNREE and ESCOM by effectiveness

Social (Including Safeguards)

65. Given the nature of the work to be undertaken in the rehabilitation, upgrade and extension of the distribution and transmission systems, land acquisition requirements are expected to be limited. The project will finance four 'greenfield' substations, none of which would affect structures or tree crops, only agricultural land or bush. All of the substations to be financed ('greenfield' and uprating of existing) are at 66kV or below, with the exception of one 132/66/33kV transformer to be up-rated, and one new 132/33kV substation. All new lines will be at distribution voltages (33kV and below), significantly reducing any resettlement or compensation needs. Nonetheless, because of these new substations and distribution lines will be built, OP/BP 4.12 for Involuntary Resettlement is triggered.

66. Because of this need to acquire land for new substations, the need for limited land acquisition in some cases for the new 33 and 11 kV distribution lines, as well as the likelihood of crop damage during rehabilitation of existing distribution lines, a Resettlement Policy Framework (RPF) has been prepared. The RPF sets out a screening process for sites in the project, known as a Land Acquisition Assessment (LAA). The LAA collects information regarding various aspects of the site and will be used to decide whether there are issues related to displacement and/or land acquisition, and whether a full or abbreviated Resettlement Action Plan (RAP) is required.

67. As the precise locations of most of the activities in Component 1 can only be determined following detailed engineering planning and design work, it has not been possible to prepare RAPs at this stage of the project cycle. In the event that a full or abbreviated RAP is needed, its preparation disclosure and implementation would be completed before the start of any construction. For a limited number of rehabilitation activities in Component 1, the location of project works is known (for example, the routes of existing distribution lines). The project appraisal has confirmed that no social impacts are expected from these activities. Nevertheless, for these activities the RPF prepared for the project provide a comprehensive framework to cover all eventualities during project implementation.

68. The nature of the envisaged investments is such that no (or very limited) physical resettlement, and the provisions of OP/BP 4.12 will generally apply to land acquisition and compensation for crop damage where this is unavoidable. In these instances, compensation will be agreed with the Project Affected Persons (PAPs). As a general principle, a 'land-for-land' approach will be adopted – that is, PAPs whose land is acquired for project activities will be offered replacement land of equivalent or greater value and convenience. At the sites of new substations, this will be the optimal approach. For the distribution line activities, much of the land is non-arable as distribution lines tend to be located in more settled areas; as such, this land will not have been allocated for use and thus will require no compensation. Compensation for assets and land would apply wherever the distribution line projects would displace users or residents or their assets. In line with the request received from the Government of Malawi, the proceeds of the IDA financing will be used to pay for any cash compensation payments that are required.

69. ESCOM's Environmental and Social Management Unit (ESMU) will be responsible for implementing the RPF, having particular responsibility for the LAA screening process set out in the RPF, the categorization of results and the determination of the necessary follow-up actions. This includes preparation and implementation of full or abbreviated RAPs if necessary, including conducting consultations with PAPs and local communities. While external consultants can assist the ESMU in this task, this does not remove the ESMU's overall responsibility.

70. The RPF was cleared by MoNREE on February 18, 2011, and was disclosed at the InfoShop on February 18, 2011 and in-country on April 14, 2011.

Environmental (Including Safeguards)

71. Given the nature of the work to be undertaken in the rehabilitation, upgrade and extension of the distribution and transmission systems (distribution-voltage 33kV and 11kV lines only; substations at 66kV or below, with the exception of one 132/66/33kV transformer and one new 'greenfield' 132/33kV substation), no significant environmental and social impacts are foreseen from project activities. Accordingly, the project has been classified as EA Category B and it triggers OP/BP 4.01for Environmental Assessment, because of the relatively minimal possible negative impacts that may occur from the physical investments. The project also triggers OP 4.11 for Physical Cultural Resources, as some of the works may affect cultural assets. A screening mechanism is included in the ESMF to ensure that any such sites are identified and avoided or impacts are mitigated, in line with OP 4.11. Awareness of possible chance finds will be raised among the public, the project contractors and operators, and chance-find procedures will be included in construction contracts. While the ESMF suggests that critical natural habitats may be affected by the project, the appraisal has confirmed that OP 4.04 (Natural Habitats) is not triggered in this project.

72. As noted in the detailed project description above, the grid strengthening & expansion activities in Component 1 are predominantly in the distribution sub-sector. As noted above, the project will finance four 'greenfield' substations, none of which would affect structures, protected areas, forests or tree crops. All new lines will be at distribution voltages (33kV and below). No large scale or irreversible impacts are envisaged from installation works.

73. An Environmental and Social Management Framework (ESMF) document has been prepared to describe the principles and procedures to be followed in addressing the relevant safeguards policies that will be triggered by the proposed project. The Project involves many proposed individual activities that will not be fully defined in terms of location and impact until detailed engineering planning and design (for example, determining distribution line routes) is undertaken during project implementation. Preparation of an ESIA will continue during project preparation and implementation. Drawing on the findings of the ESIA, an Environmental and Social Management Plan (ESMP) would be drawn up and implemented during project implementation. In addition, for the low impact activities such as the expansion of the distribution network, the bidding documents and contractor's contracts will (as set out in the ESMF) also include the requirement to prepare and implement an ESMP, specifying the environmental, social, health and safety measures that will need to be managed and mitigated by the contractor during installation works. The Consulting Engineer will have the responsibility to supervise the adequate implementation of the environmental, social, health and safety clauses by the contractors.

74. For a limited number of rehabilitation activities in Component 1, the location of project works is known (for example, the routes of existing distribution lines). The project appraisal has confirmed that no environmental impacts are expected from these activities. Nevertheless, for these activities the ESMF prepared for the project provide a comprehensive framework to cover all eventualities during project implementation.

75. The Bank will provide clearances on the ESIA that is prepared for Component 1 before it is formally approved by the World Bank.

76. The ESMF provides a framework to manage all eventualities, as well as a detailed screening methodology and form. In addition, the ESMF lists all possible negative impacts for various phases of the project, including how to handle and dispose of PCBs, pollution from construction waste generated during rehabilitation and construction phases, noise disturbance to communities, disturbance to wildlife during construction phase, occupational health and safety for workers during rehabilitation and construction phases, among others.

77. ESCOM's Environmental and Social Management Unit (ESMU) will have particular responsibility for the screening process set out in the ESMF, the categorization of results and the determination of the necessary follow-up actions. While external consultants can assist the ESMU in this task, this does not remove the ESMU's overall responsibility in this regard. The environmental and social management capacity of the ESMU will be strengthened under the project.

78. The ESMF was cleared by MoNREE on February 18, 2011, and was disclosed at the InfoShop on February 18, 2011 and in-country on April 14, 2011.

79. **Riparian Notification.** Component 2 of the project includes feasibility studies for possible future hydropower generation on the Shire River and the tributaries that eventually enter it. The Shire River is an international river shared by Malawi and Mozambique before flowing into the Zambezi River, which is shared by an additional six states, including Tanzania upstream of the Shire and Namibia, Angola, Zimbabwe, Zambia and Botswana above the confluence of the Shire and Zambezi. Consistent with the World Bank's Safeguard Policy (OP 7.50) for projects on international waters, a notification letter and an accompanying information memorandum was prepared by MoNREE, in consultation with the World Bank, and was sent out to the relevant riparians on 24 March 2011. The information memorandum notes that the hydropower-related activities will be limited to feasibility studies only; no physical investments will be made at any of the sites to be investigated. Accordingly, there will be no impact in the flows of the Shire and Zambezi rivers or any other waterway as part of this particular project.

80. As for the ESIA in Component 1 noted above, the Regional Safeguards Advisor will provide clearances for all the ESIAs that are prepared for Component 2 (either standalone or as integrated parts of the feasibility studies) before they are formally approved by the World Bank.

81. The following table summarises which safeguards policies are triggered by the project, and provides an explanation for those that have been triggered:

Safeguard Policies Triggered	**Yes**	**No**
Environmental Assessment (OP/BP 4.01)	X	
The project is expected to have site-specific and very limited environment and social impacts. Project investments are limited to urban and peri-urban areas. 'Greenfield' investments are limited to four new medium-voltage substations. In order to provide an environmental and social impact screening mechanism, an Environmental and Social Management Framework (ESMF) and Resettlement Policy Framework (RPF) have been prepared as part of the project preparation process and have been disclosed in-country and in the Infoshop.		
Natural Habitats (OP/BP 4.04)		X

There will be no impacts on natural habitats.		
Forests (OP/BP 4.36)		X
There will be no impacts on forests.		
Pest Management (OP 4.09)		X
Physical Cultural Resources (OP/BP 4.11)	X	
It is not anticipated that the proposed project will adversely affect sites having archeological, paleontological, historical, religious, or unique natural values as defined under OP 4.11. 'Greenfield' investments are limited to four new medium-voltage substations and no physical cultural resources issues are apparent from physical inspections. However, it is possible that physical/cultural resources might be revealed during installation works. Accordingly, this safeguard policy is triggered on a precautionary basis. Detailed site screening will be undertaken during project implementation once precise locations are known. All contracts for activities in Component 1 (i.e. those involving physical investments) will include a Chance Finds Procedures, as set out in the ESMF.		
Indigenous Peoples (OP/BP 4.10)		X
Involuntary Resettlement (OP/BP 4.12)	X	
Limited compensation for involuntary resettlement is expected, primarily for crop damage and limited land acquisition from installation of new sub-transmission voltage lines (33kV and below) and construction of new medium-voltage substations. However, this policy is triggered to provide a framework to manage both land acquisition and any possible displacement required; an RFP has been prepared for the project, which has been disclosed in-country and in the Infoshop. If land acquisition and/or displacements are necessary during project implementation, then full or abbreviated RAPs will be prepared as necessary. Mitigation instruments and procedures for possible crop damage will be assessed during the implementation process.		
Safety of Dams (OP/BP 4.37)		X
Although the feasibility studies for new hydropower sites financed under Component 2 of the project will, in least one case (Lower Fufu), encompass detailed engineering design for a dam, OP/BP 4.37 is not triggered at this stage since the project is not financing construction of any dams. However, the World Bank takes dam safety concerns seriously and always promotes best practice in the design of new dams, as well as during any later stages of project development. To this end, the project will finance a separate and independent expert (or group of experts) to review the quality of the dam studies and designs being undertaken by the main consultant, in order to guarantee that they reflect international best practice and standards with respect to dam safety. In addition, an Environmental and Social Advisory Panel (ESAP), consisting of one environmental expert and one resettlement expert, will be established to review and advise on the ToR, full ESIA, RAP and other safeguards aspects for the hydropower sites being studied. Furthermore, financing will be provided under Component 4 of the project for technical assistance on measures necessary to strengthen the institutional, legislative, regulatory and safeguards frameworks for dam safety programs, as part of Government's forward planning for the development and operation of new hydropower plants in Malawi.		
Projects on International Waterways (OP/BP 7.50)	X	
The project supports feasibility studies of new hydroelectric power generation sites which , if developed, will involve the use of the Shire river, which forms part of the larger Zambezi watershed and is defined as an international waterway, as well as tributary rivers that drain into Lake Malawi. Accordingly, this policy is triggered. The riparian notification process has been undertaken and the notification period concluded on May 1, 2011.		
Projects in Disputed Areas (OP/BP 7.60)		X

Monitoring & Evaluation

82. Taken as a whole, Malawi's national M&E system is characterized by weak capacity and fragmentation. Currently neither the energy sector as a whole, nor the electricity sub-sector has an integrated, functioning M&E system or management information system. At the project level, the current capacity of the implementing agencies to monitor and evaluate the outcomes and results of the project is somewhat limited, due to a lack of experience in World Bank or other externally-funded projects.

- Comprehensive M&E capacity strengthening initiatives are proposed, primarily a thoroughgoing reform of ESCOM's management information system, to be financed via the MCC Compact. While this will, in future, provide ESCOM management a comprehensive and accurate picture of key metrics in ESCOM's operations, particularly in its commercial performance, implementation of this system will not be a prerequisite for effective M&E of the proposed WB-financed project, given the arrangements noted above.

- However, as part of the project's Component 4 (Capacity Building & Technical Assistance), financing will be made available for general institutional strengthening of the project management units at MoNREE and ESCOM, including for M&E systems and staff.

83. The focus of M&E during implementation will be on Components 1 and 3. (As Component 2 consists only of feasibility studies, there is less need for a quantitative M&E focus in particular). The key aspects to be monitored in Component 1 will include the timely and efficient construction and commissioning of (i) new / rehabilitated substations, (ii) new / rehabilitated distribution lines and (iii) upgrading of the LV reticulation. Monitoring costs will also important, as will the effective implementation of the ESMF and RPF. Annex 1 presents the project's results framework that defines specific outputs and results to be monitored under this project.

84. In Components 1 and 3, ESCOM will have the responsibility to supply up-to-date data on the set of agreed performance indicators (set out in Annex 1), at least on an annual basis for PDO indicators and on a semi-annual basis for the intermediate outcome indicators at component level. These will be discussed during WB project supervision missions. M&E inputs will be based on both technical survey and administrative data sources. The baseline indicators being developed by ESCOM draw from existing ESCOM data and project preparation studies. The results of the M&E activities will be fed back into the implementation process as improved practices. The ESCOM project co-ordinator will provide data and reports to the Technical Electricity Committee and the World Bank.

85. In component 1a, ESCOM will be assisted in M&E tasks by the Consulting Engineer. As set out in the detailed project description in Annex 2, the consultant will provide support and training to ESCOM's technical services, including: (i) technical guidance to allow ESCOM to undertake 'technical loss audits', and (ii) development of utility reliability indices such SAIDI and SAIFI for measuring performance. Both of these elements of the Consulting Engineer's ToR will provide critical data inputs into ESCOM's overall M&E systems and reporting.

86. In addition, in Component 1b (LV reticulation, where installations works will be undertake by ESCOM), the Consulting Engineer will play an independent verification / 'due diligence' role in Component 1b, providing data and reporting as part of their ToR.

87. Similarly, in Component 3, a supervision consultant will assist ESCOM in monitoring project implementation. In this particular component, M&E will be technically simpler than in Component 1, in that collecting data will not require specialised measurements or equipment. (For example, reduction of MW of peak load from HWGs will be a simple function of the MW capacity of the heating elements replaced).

88. In support of the M&E goals, the Bank task team will carry out the normal review procedures for procurement, as well as regular supervision missions, including with an M&E specialist as necessary. The Bank will also carry out a mid-term review after 30 months from Effectiveness of the project and an Implementation Completion and Results Report (ICR) at the end of the project.

Annex 4
Operational Risk Assessment Framework (ORAF): Disclosable Version
Malawi: Energy Sector Support Project

Project Development Objective(s)	
The Project Development Objective is to increase the reliability and quality of electricity supply in the major load centers	
PDO Level Results Indicators:	1. Reduction in electricity losses per year in the project areas [Core Indicator]
	2. Total Interruption Time per KVA Installed (TITK) per year in the project areas
	3. Direct project beneficiaries (number), of which female % [Core Indicator]

Risk Category	Risk Rating	Risk Description	Proposed Mitigation Measures	Timing for Mitigation
Project Stakeholder Risks				
Stakeholder	MI	Lack of clarity in GoM decision-making – characterised by interventions from various layers of Government – delays project preparation or implementation. (It is, however, assessed, that all levels of GoM, as well as ESCOM, have a shared vision of the project and a commitment to its implementation and results)	Open channels of communication for all stakeholders, including MoNREE, ESCOM and other Ministries, will be enhanced by the two levels of project co-ordination: (1) Project Steering Committee at PS / CEO level, and (2) Technical Electricity Committee at Director level. By bringing in all GoM stakeholders, including at senior (PS) level, risks should be minimised.	Implementation
	L	Rejection of / tampering with DSM/EE investments (Component 3) by households, particularly the wireless load-control devices.	A public information/media campaign is planned, covering the benefits of energy savings in general, but will also point out the specific expenditure-reducing benefits of the retrofit program.	Implementation
Implementing Agency Summary Risk Assessment	ML	Limited human resource capacity and limited experience of WB procedures, particularly regarding FM and procurement, creates delays during implementation. Relatively low level of technical / project management / contract management capacity at ESCOM slows implementation or reduces quality of Component 1b (LV reticulation).	Component 4 provides resources for training and capacity-building for the two IAs, particularly in fiduciary issues. A one-week WB procurement workshop, tailored to the energy sector and led by a HQ-based procurement specialist, was held in Lilongwe in April 2011 to prepare the project teams for implementation. Financing for a team of specialist trainers to enhance ESCOM's training school will increase ESCOM's linesmen/technicians' technical skills before implementation of Component 1b. A Consulting Engineer will play an independent verification / 'due diligence' role in Component 1b, to provide assurance to	Implementation

Risk Category	Risk Rating	Risk Description	Proposed Mitigation Measures	Timing for Mitigation
			ESCOM management and the WB that works are proceeding correctly. Proactive implementation support from WB task team will help address issues as they arise.	
Project Risks	**Risk Rating**	**Risk Description**	**Proposed Mitigation Measures**	**Timing for Mitigation**
Social & Environmental	L	Population negatively affected by project activities	An ESMF and RPF has been prepared for the project. The grid strengthening & expansion activities (Component 1) are predominantly in the distribution sub-sector. The project will finance four 'greenfield' substations, none of which would affect structures, protected areas, forests or tree crops. All new lines will be at distribution voltages (33kV and below). No large scale or irreversible impacts are envisaged from installation works. See Annex 2 for details. ESIAs/ESMPs and/or RAPs will be prepared as and when necessary during project implementation. In addition, ESCOM's environmental and social safeguards team will receive training in WB safeguards procedures (Component 4)	Implementation
		Hydrologic risk in Component 2 (feasibility studies): utility of studies may be reduced by increased risk of unavailability of water for power generation at full capacity as a result of hydrologic and climate variability, rendering the site(s) unsuitable for hydro generation.	Assessment of the risk, and incorporation of reservoir operational measures system-wide to reduce the risk, will be an integral part of the studies. Moreover, the feasibility study will leverage ongoing work on impact of hydrologic variability and climate change in the Zambezi and Shire basins. Also, as construction of larger hydropower plants will be in medium-to-long term, Malawi is also like to interconnect to the SAPP over the same timeframe.	Implementation
Program & Donor	L	Slow progress in implementation of MCC Compact. (Given the minimal activities of other donors in the sector, no other donor or program risks are identified)	Continued close co-ordination with MCC team as well as GoM's MCA implementation team in Malawi	Implementation
Delivery Quality	ML	Financial constraints at ESCOM may hamper proper maintenance of the new and upgraded transmission and distribution network components and hence sustainability of the project results	Recent tariff increases – and GoM's agreement to further tariff rises -- will help improve ESCOM's financial position, allowing the generation of resources to undertake maintenance. In addition, ESCOM will continue to implement a Financial Plan to keep control of costs and will reduce loss rates via installation of meters.	Implementation
		Slow and/or low-quality procurement process from the implementing agencies for the main contracts; limited	Component 4 provides financing for capacity-building & TA to improve the implementing agencies to adhere to WB	Implementation

Risk Category	Risk Rating	Risk Description	Proposed Mitigation Measures	Timing for Mitigation
		capacity of ESCOM to supervise contractors during implementation.	guidelines and processes. Component 1 will include financing for a Consulting Engineer to support ESCOM in all aspects of project implementation, including design and contractor supervision.	
		Project analytical outputs (e.g. feasibility studies in Component 2) may not have full impact because of a lack of GoM commitment to moving forward.	None	N/A

Overall Risk Rating during Implementation

Risk Rating (before mitigation measures)	Date	Comments
MI	May 22 2011	There is a high level of commitment to the project at senior Government level. During **implementation**, the rating reflects the relatively limited capacity of the implementing agencies and their minimal experience of implementing WB-financed projects. As the rating reflect risks **before** mitigation, the ratings is MI.

MI: Medium-I (High Impact/Low Likelihood); **ML**: Medium-L (Low Impact/High Likelihood) ; **L**: Low (Low Impact/Low Likelihood)

Annex 5: Implementation Support Plan
Malawi: Energy Sector Support Project

Strategy and Approach for Implementation Support

1. The strategy for implementation support has been developed based on the nature and activities of the project, its specific risk profile, the capacity of the implementing agency and the broader operating environment in Malawi. Its aim is to make the WB's implementation support to the client more flexible, timely, and focused on the risk mitigation measures defined in the ORAF.

2. **Contractual issues.** It is recognised that the implementing agencies have limited capacity as well as minimal experience in implementing activities using World Bank procurement guidelines. The packaging of contracts – scope, scale and type – takes this into account. The largest contracts are focused in Component 1a (Distribution & Transmission Uprating and Expansion) and will be implemented by ESCOM, which has some experience in contracts of this scale. The contracts will be 'Supply & Install' types, requiring relatively little direct input from ESCOM during project implementation. In addition, the project provides extensive financing (US$3.3 million) for a Consulting Engineer that will assist ESCOM with preparation and implementation of the large contracts. The Consulting Engineer will, inter *alia*, (i) undertake preliminary survey & design work, (ii) prepare the Bid Documents, (iii) co-ordinate the procurement processes, (iv) support ESCOM to supervise contractors during implementation. Further details are provided in Annex 2 above. In addition, the Consulting Engineer will play an independent verification / 'due diligence' role in Component 1b (LV reticulation reinforcement), to provide assurance to ESCOM management and the WB that works in that component, which will be implemented by ESCOM, are proceeding correctly.

3. The contracts implemented by MoNREE, which has minimal experience with WB-financed projects, are limited to consultancy contracts. These require relatively little hands-on management by MoNREE officials.

4. **Procurement support.** Implementation support from the WB for procurement for the two implementing agencies (MoNREE and ESCOM) will include: (a) providing training in WB procurement procedures to the staff of the ESPS in MoNREE and the PMU in ESCOM, (b) reviewing procurement documents and providing timely feedback to the procurement officers at the implementing agencies; (c) providing detailed guidance on the Bank's Procurement Guidelines to the procurement officers; and (d) monitoring procurement progress against the detailed Procurement Plan, which will be updated every six months (or as required) to reflect project implementation needs and improvements in institutional capacity. Throughout implementation, the WB task team, with inputs from the Lilongwe-based Procurement specialist, will work with the project coordinators at the ESPS and PMU to assist with procurement matters.

5. **Partnership & Policy Issues.** There is no co-financing for this project. However, as discussed at various points in this PAD, MCC is in parallel financing a large program of support to the energy sector over a similar timeframe. Careful consideration has been made of the implications of this during the implementation phases of the MCC Compact and the WB-financed project, particularly in terms of the capacity of the implementing agencies. The MCC Compact will be implemented by a standalone project implementation unit, rather than directly via ESCOM's services, implying that there will not be excessive burdens on the capacity of the implementing agencies. In addition, as both the MCC Compact and the WB-financed project have been prepared using the same set of detailed feasibility studies, implementation support and technical advice from both the WB and the MCC teams' inputs will be in support of the same overall programmatic objectives. That said, and as stated

above, the World Bank is supporting a stand-alone project and is not part of any joint co-financing. Achieving the project's Development Objective and the expected results does not depend on implementation of, or progress in, the MCC Compact.

6. Regarding policy issues, a common set of important policy energy sector reforms has been identified during the extended preparation period of both the WB-financed project and MCC Compact. These include appropriate tariff adjustments, improved financial sustainability of ESCOM and creating an improved environment for private investment in the energy sector (including via reforms of the legal framework). As part of the development of this project, and as noted above, the Government of Malawi has prepared a 'Letter of Intent' that sets out a program of energy sector reforms that it proposes to implement over the lifetime of the project. While the WB will, for its part, continue to support progress on these important energy sector policy reforms, these issues are not part of the WB-financed project itself (for example, via effectiveness conditions or project covenants).

7. **Financial Management.** The WB team has reviewed the project's financial management system including, but not limited to, accounting, reporting and internal controls. The findings are set out in the Financial Management section of Annex 3 above. As detailed there, it was determined that the overall FM risk is **moderate**. As also detailed in that section, **Designated Accounts** will be set up for the project, one for each implementing agency. The ceiling for the maximum amount of the IDA proceeds that may be deposited in the DAs was agreed at negotiations and is reflected in the disbursement letter. Throughout implementation, the WB task team, led by the Lilongwe-based FM specialist, will work with the project coordinators at the ESPS and PMU to assist in improving financial management and reporting.

Implementation Support Plan

8. This section sets out the level of technical support needed for the project. The World Bank team members will be based either in Washington HQ or in the Africa Region, and will be available to provide timely, efficient and effective implementation support to the ESPS in MoNREE and PMU in ESCOM.

9. **Technical inputs.** Technical knowledge will be particularly important in Components 1a and 2. In **Component 1a (**Distribution & Transmission Uprating and Expansion**)**, technical knowledge of transmission and distribution engineering techniques and technologies will be required, particularly of substation design, in order to draw up appropriate technical specifications This will need to be accompanied by appropriate levels of knowledge and experience of contract management to draw up Bid Documents and supervise the procurement process. During project implementation, technical supervision is required to ensure contractual obligations are met. The Bank's project team will include an experienced transmission and distribution power engineer, with extensive knowledge of procurement of large T&D contracts, and will accompany ESCOM staff on regular project site visits throughout the duration of the project. Moreoever, as noted above, the project will provide extensive financing (US$3.3 million) for a Consulting Engineer ("Owner's Engineer") that will assist ESCOM with preparation and implementation of the technical aspects of these large contracts. The ToR for the Consulting Engineer will be carefully prepared to ensure that a firm with experience of similar large T&D contracts in multiple countries is procured.

10. For Component 2, (Generation & Transmission Feasibility Studies), expertise in assessing and designing hydropower (and transmission) stations will be required. However, as no physical investments will be made in this project, all the necessary know-how will be supplied by the engineering consulting firm that wins the contract. From the Bank's task-team, an experienced hydropower specialist has already assisted ESCOM in preparing the ToRs for these tasks, and will

assist ESCOM in supervising the work of the selected engineering consulting firm, including via regular project supervision visits.

11. **Environmental and Social Safeguards**. As set out in Annex 3 above, compliance with environmental and social safeguards will be the primary responsibility of the ESMU at ESCOM. This includes implementation of the RPF (including the preparation and implementation of full or abbreviated RAPs if necessary, as well conducting consultations with PAPs and local communities) and the ESMF. In addition, as noted in Annex 3 above, it has not been possible at this stage of project preparation to prepare ESIAs/ESMPs, which will be prepared as and when necessary during project implementation, and the ESMU will also have responsibility for overseeing the continued preparation of this.

12. The ESMU has some limited experience and capacity related to World Bank social and environmental safeguards based on implementation of previous World Bank projects. The Bank team's social and environmental safeguards will provide ongoing guidance to ESCOM's specialists in addressing any issues as they may arise. The environmental and social management capacity of the ESMU will be strengthened under the project. In addition, the project provides funding for ESCOM to hire specialized environmental and social consultants to assist the ESMU with its responsibilities under WB guidelines, including undertaking the environmental and social screening processes set out in the project's ESMF and RPF, during the detailed design and project implementation phase.

13. Furthermore, the ToRs of the Consulting Engineer (see above) will state that the Consulting Engineer will have the responsibility to supervise the adequate implementation of the environmental, social, health and safety clauses included in the Supply & Install contracts of the contractors, which will assist ESCOM in meeting the WB's safeguard policy guidelines in this respect.

14. **Fiduciary requirements and inputs.** The section above set out the proposed approach to procurement and FM support during project implementation. Component 4 of the project (Capacity Building & Technical Assistance) will provide resources for institutional strengthening and capacity-building on fiduciary topics at the project management units at MoNREE and ESCOM. This will include training in World Bank procurement and FM procedures, and the Bank task team will help both MoNREE and ESCOM identify their capacity building needs to strengthen its project financial management capacity and improve procurement management efficiency.

15. In addition, a one-week procurement workshop tailored to the energy sector and led by a HQ-based procurement specialist was held in Lilongwe in April 2011 in preparation for project implementation. This procurement workshop reviewed both general WB guidelines and procedures and also focused on case-studies to help improve implementation readiness. Procurement officers from both MoNREE and ESCOM participated in the workshop.

16. The Bank's regular FM and procurement supervisions will provide timely advice on budget planning and/or any need for adjusting financing priorities within overall allocations of spending ministries. The Bank team's Lilongwe-based FM and procurement specialists will also be available to assist the implementing agencies throughout the project.

17. **Audit**. The results of the FM capacity assessment, presented in Annex 3 above, demonstrate that ESCOM and MoNREE has adequate internal controls for the project, including regular reconciliation of bank accounts, adequate segregation of duties, proper accounting policies and procedures, and monthly reconciliation of World Bank disbursement summaries with accounting records. The implementing agencies will be responsible for the timely compilation of annual project financial statements for the independent external audit. Project financial statements will be audited by an independent external auditor acceptable to the Bank, financed from the proceeds of the IDA

resources. In addition these external auditors will help identify any internal control deficiencies and accounting issues. The audit reports, audited financial statements and management letter will be delivered to the Bank within six months of the end of each fiscal year. The Bank team's Lilongwe-based FM specialist will be available to assist the implementing agencies throughout the project.

18. **Monitoring and Evaluation**. Both ESCOM and MoNREE have developed some M&E capabilities from working on other projects, and will further strengthen its capacity for outcome and results monitoring as needed. Component 4 of the project (Capacity Building & Technical Assistance) will provide resources for institutional strengthening and capacity-building on M&E, via targeted training programs for staff at the implementing agencies. In addition, the Task Team's M&E specialist will be available on an as-needed basis.

19. The main focus of support from the WB task team to implementation during the project period is summarized as follows:

Skills Mix Needed in Project Implementation

Time	Focus	Skills Needed	Resource Estimate
First twelve months	Hiring of the Consulting Engineer (to undertake survey and design work) and preparation of the corresponding Bid Documents.	Power engineering technical and procurement expertise, specialized in T&D	US$60,000 for a project power engineer, for approximately 40% of a Full Time Equivalent (FTE) position.
	Finalisation of ToRs for Generation Feasibility Studies	Hydropower specialist	US$15,000, for approximately 10% of 1 FTE position.
	Demand Side Management and Energy Efficiency design of Bid Documents	DSM and EE expert	US$15,000, for approximately 10% of 1 FTE position.
	Implementation of environmental and social safeguards	Environmental and Social Safeguards specialists	US$15,000 each, for approximately 10% of 2 FTE positions.
	Roll-out of M&E system	M&E specialist	US$10,000, for approximately 10% of 1 FTE position.
	Implementation of FM/Procurement system	FM/Procurement	US$15,000, for approximately 20% of 1 FTE position (LRS staff)
12-48 months	Technical power engineering supervision support	Power Engineer	Annual resource estimates as above
	Inputs to feasibility study interim and draft final reports	Hydropower specialist	
	DSM/EE program implementation technical support	DSM and EE expert	

	Safeguards supervision M&E supervision Procurement & FM supervision	Environmental and Social specialists M&E specialists Procurement/FM specialists	

Skills Mix to be Provided by the WB Task Team

Skills Provided	Number of Staff Weeks	Number of Trips	Comments
Power Engineer	20 weeks (40% of FTE)	2 per year	To be adjusted annually depending on available supervision budget
Hydropower Specialist	5 weeks (10% of FTE)	1 per year	
DSM/EE Specialist	5 weeks (10% of FTE)	2 per year	
Social Specialist	5 weeks (10% of FTE)	1 per year	
Environmental Specialist	5 weeks (10% of FTE)	1 per year	
M&E Specialist	5 weeks (10% of FTE)	1 per year	
Procurement Specialist	10 weeks (20% of FTE)	Local staff	
Financial Management Specialist	10 weeks (20% of FTE)	Local staff	

Annex 6: Team Composition

World Bank staff and consultants who worked on the project:

Name	Title	Unit
Rob Mills	Sr. Economist, TTL	AFTEG
Vahid Alavian	Hydropower Adviser	AFTEG
Gulgoren A. Cansiz	Consultant/Power Engineer	AFTEG
Robert Robelus	Consultant/Environmental Safeguards Specialist	AFTUW
Mohamed Arbi Ben-Achour	Lead Social Development Specialist	AFTCS
Mitsunori Motohashi	Financial Analyst / Young Professional	AFTEG
Sara Nso	Economist/ Jr Professional Officer	AFTEG
Marjorie Mpundu	Sr. Counsel	LEGAF
Jose Janeiro	Sr. Finance Officer	CTRFC
Steven Maclean Mhone	Procurement Specialist	AFTPC
Trust Chimaliro	Consultant/Financial Management Specialist	AFTFM
Elvis Langa	Financial Management Analyst	AFTFM
Luiz Maurer	Sr. Energy Specialist	AFTEG
Jennifer Chang	Financial Analyst / Economist	LCSEG
Jutta Kern	Monitoring & Evaluation Specialist	AFTDE
Magnus Gehringer	Senior Geothermal Energy Specialist	SEGES
Grace Chilambo	Team Assistant	AFMMW
Marie-Paule Ngaleu	Short Term Temporary	AFTEG
Wendy Hughes	Senior Energy Specialist (Peer Reviewer)	EASNS
Reynold Duncan	Lead Energy Specialist (Peer Reviewer)	AFTEG
Kwawu Mensan Gaba	Lead Energy Specialist (Peer Reviewer)	SASDE

ENERGY SECTOR SUPPORT PROJECT.