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IMPLEMENTATION COMPLETION REPORT
(IDA-23860)

ON A

CREDIT

IN THE AMOUNT OF US\$55.0 MILLION

TO THE

REPUBLIC OF MALAWI

FOR POWER V PROJECT

December 27, 2000

AFTEG
Africa Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective June 30, 2000)

Currency Unit = Malawi Kwacha (MK)

MK 1.00 = US\$ 0.018

US\$ 1.00 = MK 55.85

FISCAL YEAR

April 1- March 31

ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank
CDC	Commonwealth Development Corporation
DCA	Development Credit Agreement
DSP	Divestiture Sequence Plan
EIB	European Investment Bank
EMU	Environmental Management Unit
ERR	Economic Rate of Return
ESCOM	Electricity Supply Commission of Malawi
FMO	Nederlandse Financierings-Maatschappij voor Ontwikkelingslanden
FRDP	Fiscal Reform and Deregulation Project
GWh	Gigawatt hour
GDP	Gross Domestic Product
ICR	Implementation Completion Report
KfW	Kreditanstalt für Wiederaufbau
kWh	Kilowatt hour
MIS	Management Information System
NORAD	Norwegian Agency for Development Cooperation
NDF	Nordic Development Fund
PCC	Petroleum Control Commission
RSA	Rapid Supervision Assessment
SAR	Staff Appraisal Report
SIDA	Swedish International Development Agency
SCADA	System Control and Data Acquisition
TOR	Terms of Reference

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<i>Project ID:</i> P001662	<i>Project Name:</i> POWER V
<i>Team Leader:</i> Paivi Koljonen	<i>TL Unit:</i> AFTEG
<i>ICR Type:</i> Core ICR	<i>Report Date:</i> December 29, 2000

1. Project Data

Name: POWER V *L/C/TF Number:* IDA-23860
Country/Department: MALAWI *Region:* Africa Regional Office
Sector/subsector: PH - Hydro; PY - Other Power & Energy Conversion

KEY DATES

<i>PCD:</i> 01/22/90	<i>Effective:</i> 06/30/92	<i>Original</i> 12/21/93
<i>Appraisal:</i> 07/01/91	<i>MTR:</i>	
<i>Approval:</i> 06/17/92	<i>Closing:</i> 06/30/98	06/30/2000

Borrower/Implementing Agency: GOVERNMENT/ESCOM/EPD
Other Partners: Commonwealth Development Corporation (CDC), European Investment Bank (EIB), Kreditanstalt für Wiederaufbau (KfW), Nederlandse Financierings-Maatschappij voor Ontwikkelingslanden (FMO)

STAFF	Current	At Appraisal
<i>Vice President:</i>	Callisto E. Madavo	E.V.K. Jaycox
<i>Country Manager:</i>	Darius Mans	Stephen Denning
<i>Sector Manager:</i>	Ananda Covindassamy	David Cook
<i>Team Leader at ICR:</i>	Paivi Koljonen	Assefa Telahun
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2. Principal Performance Ratings

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HL=Highly Likely, L=Likely, UN=Unlikely, HUN=Highly Unlikely, HU=Highly Unsatisfactory, H=High, SU=Substantial, M=Modest, N=Negligible)

Outcome: U

Sustainability: UN

Institutional Development Impact: M

Bank Performance: S

Borrower Performance: U

	QAG (if available)	ICR
<i>Quality at Entry:</i>		S
<i>Project at Risk at Any Time:</i> Yes		

3. Assessment of Development Objective and Design, and of Quality at Entry

3.1 Original Objective:

The objective of the project was to implement the power component of the least cost energy strategy adopted by the Government of Malawi. The specific objectives were to: (i) meet the growth in demand for power in a least cost manner through the construction of the Kapichira hydroelectric scheme and the rehabilitation of the hydro, standby gas, and diesel power plants (ii) improve the quality of power supply through reinforcing the transmission and distribution systems to minimize outages and reduce losses; (iii) strengthen the capacity of energy sector institutions to plan, manage, and operate the energy sector facilities and institutions; and (iv) assist in rationalizing sector-wide energy pricing policy.

Following four previous Bank operations in support of Malawi's energy sector development, the project arose from a long-standing dialogue between the Bank and the Borrower. The objective was realistic and relevant for the country and consistent with the Bank's country assistance strategy. The project directly supported the Government's structural adjustment program, which included least cost power development, decreasing dependence on imported oil and coal, and arresting the depletion of indigenous fuel wood resources. The project was justified in view of the expected growth in electricity demand. The project was supported by a significant amount of preparatory work, notably a comprehensive Power Sector Least Cost Expansion Plan carried out under the previous project, Energy I (Cr. 1990-MAI). The institutional strengthening and energy pricing were a continuation of activities initiated under the Energy I project and were critical for the sustainability of the project. The Bank's involvement in the project was also expected to assist aid flow to the power sector and its application in priority areas.

Implementation was demanding for the Borrower. This was, after all, the largest project ever implemented in Malawi. Even though the Electricity Supply Corporation of Malawi (ESCOM), the main implementing agency, was a competently managed and operated utility at the time of appraisal, the project's appraisal report recognized its limited capacity to implement such a complex project. Consequently, the project financed engineering consultants to help ESCOM in the design and supervision of the project. During implementation it became clear that the coordination of a large number of contractors (13), stretched ESCOM's implementation capacity. Also, the closing of the project's financing gap, which was for the most part caused by the donor community's withdrawal of support to Malawi for governance reasons in 1992, proved to be a demanding task and the 18-month delay in effectiveness was caused by this factor.

3.2 Revised Objective:

The restructuring of the project in June 1998 excluded the specific objective aimed at improving the quality of power supply through reinforcing the transmission and distribution systems. The restructuring was required since the Borrower could not mobilize donor support to close the foreign exchange financing gap for these components.

3.3 Original Components:

Power Components

A. Kapichira Hydroelectric Scheme: (i) construction of an 800 m long earth fill and composite earth-rock fill dam at Kapichira Falls creating a pondage of about 200 ha for daily regulation; provision of a 450 m long power canal and power intake, two steel penstocks, a power house to accommodate five generating units, a tailrace, and a switchyard; (ii) installation of two Francis turbines coupled to two 25 MW generators with associated electromechanical equipment; (iii) switchgear and control equipment for Kapichira Switchyard and extension of substations at Tedzani and Blantyre West; (iv) construction of about 58 km of 132 kV single circuit transmission line from Kapichira Switchyard to Tedzani III; (v)

extension of the SCADA system to include Kapichira and upgrading the existing generation control microcomputer center at Nkula B power station and interface of the telemetry software with the existing system; (vi) establishment of single channel PLC and telephone links to Kapichira to connect it to the existing system; and (vii) engineering services for the design, supervision, and management of the hydroelectric scheme, provision of a panel of experts to review the design and provide advice on technical issues during the construction phase.

B. Generation Rehabilitation. This component aimed at improving the availability of the existing power plants through reconditioning or replacement of runners, guide vanes, and cooling systems; provision of essential spares and rehabilitation of the intake structure for the hydro power stations; and acquisition of spares for the gas turbines and diesel power plants.

C. Transmission Reinforcement. This component focused on improving the reliability of the transmission system to the Northern Region through acquisition and installation of tubular steel poles and steel cross-arms to replace the existing wood poles and wooden cross-arms; construction of a control building; and installation of a control system at Lilongwe to improve data collection and storage, reduce outage times, and facilitate operations.

D. Distribution Reinforcement. This component was to improve the reliability of the distribution system and reduce the distribution losses through installation of substation transformers at key locations; reconductoring of the 11kV and low voltage systems in the southern, central, and northern regions; and construction of low voltage overhead lines and underground cables, installation of distribution transformers and provision of energy meters, autoclosures and sectionalizers, and acquisition of vehicles for use in the distribution systems.

E. Institutional Strengthening of ESCOM: (i) consultancy services for studies to determine the least cost option for power supply after Kapichira and provision of expert services; (ii) establishing a strategy for computerizing ESCOM's financial and technical operations, provisions for the acquisition of one central computer system at ESCOM's headquarters and 18 microcomputers; and (iii) provision for training of ESCOM's staff, including provision for training aids, to assist in building capacity to plan, manage and operate ESCOM's facilities and systems.

Non-power components

F. Energy Planning and Policy: (i) household energy strategy study to establish a data base of household energy supply and demand, examine the supply and marketing of various forms of household energy, with emphasis on biomass energy, including substitution possibilities, and recommend a household energy strategy; and (ii) provision of about 15 man months of expert services on an as-needed basis, to assist the Government on energy-related issues including advice on petroleum or coal exploration and to address energy conservation and demand management measures.

G. Petroleum Supply. This component financed expert services to review arrangements for petroleum product procurement, transportation, and bulk storage and the legal framework of the Petroleum Control Commission (PCC).

H. Energy Efficiency. Technical advisory services to the Tobacco Control Commission to demonstrate energy efficient barn designs for tobacco curing for small holder farmers and to promote the use of softwood charcoal as a substitute for the scarce hardwood charcoal used in curing tobacco.

3.4 Revised Components:

The optimization study that was included in the project scope, refined the design of Kapichira. It relocated the power house to the river's left bank, eliminated the 450 m long intake canal by designing the power house adjacent to a cliff, reduced the size of the reservoir, increased the capacity of the generating units from 25 MW to 32 MW each, and reduced the number of generating units from five to four. These changes addressed the environmental impacts identified in the Environmental Assessment and resulted in a more compact and environmentally friendly arrangement which would be less disturbing to the wildlife of the Majete Game Reserve. This design also reduced the estimated cost.

In 1996, the Bank reallocated the credit to use the savings that resulted from the final design to reduce the project's financing gap. It financed the installation of the Kapichira generators and a portion of the generation rehabilitation (the dredging of the Nkula reservoir). This reallocation was critical for the continuation of the project for several reasons. First, the Kapichira generators and turbines were unexpectedly without financing after credit effectiveness because AfDB was unable to meet its co-financing commitment. Subsequently, KfW agreed to finance the water turbines. Second, the dredging of the Nkula reservoir had emerged, after appraisal, as a critical measure to restore the generating capability of Malawi's main hydropower plant because the silt in the reservoir had increased rapidly. The reservoir's live storage of 9 m had shrunk to less than 3 m thereby drastically reducing the output of the plant. As the water intake for the Blantyre Water Board was located in the reservoir, the dredging would also improve water supply.

A major restructuring in June 1998 canceled the transmission and distribution components and the energy efficiency component. The former two were canceled because of the lack of co-financing and the latter because of protracted delays in start-up, which made its objective unattainable. At a later stage, the project added financing of advisory services for the development of a Power Sector Policy.

3.5 Quality at Entry:

The Implementation Completion Report (ICR) finds the quality at entry to be satisfactory because:

- project objectives were consistent with the country assistance strategy and Government development priorities;
- the design had a good balance between generation expansion and the rehabilitation and reinforcement of the existing generation, transmission, and distribution systems;
- the power components were well-defined and supported the project's objectives. Their design was based on rigorous engineering studies and they were adequate to meet the forecast power demand. The project incorporated a review of the detailed design before construction began;
- the Bank's safeguard policies were strictly observed. This was the first project in the Bank's Africa Region subject to a full Environmental Assessment (EA) under the Bank's new environmental policy. Adequate consultations were carried out with Government agencies and NGOs during the EA field work. The recommendations of the EA were incorporated in project design. The project also included a Panel of Experts to review the design and safety of the dam; and
- the design coordinated donor support under the umbrella of one project to relieve the Government's capacity constraints.

The project's staff appraisal report (SAR) identified several project risks and considered that these could be managed through design and credit conditionalities. First, there was the risk of the probable inaccuracy of the power demand forecast, which could be negatively affected by an unexpected adverse economic or political situation of the region. This risk was minimized by the two-staged development of the Kapichira scheme. Second, the risk of low free water level of Lake Malawi resulting from probable consecutive dry years was expected to be mitigated either through: (i) a contingent plan of dredging the channel connecting Lake Malawi to the Shire river; or (ii) construction of thermal plant; or (iii) interconnection with neighboring countries. Third, the project ran the risk of delay if the financing gap could not be closed as early as possible. This could be mitigated by trimming the project to only the hydropower components. The SAR noted, however, that this would jeopardize some of the objectives and benefits of the project. Fourth, there was the possibility of a financial risk in the event that project costs exceeded the estimates. This risk was mitigated by making ample provision in the form of contingencies for civil works, and by using higher-than-average quotes on suppliers' prices for the major electromechanical equipment. Fifth, the institutional risks were to be minimized through conditionalities included in the project.

In hindsight, although most of the risks were realistically assessed in the SAR and well managed through project design, two of them seem to have been underestimated and subsequently the measures identified were not adequate to mitigate them. In particular, the SAR appears to have underestimated the institutional risks, which could not be minimized through conditionalities. The institutional risks largely related to the erosion of ESCOM's autonomy brought about by political interference. The SAR recognized the weakness of the power sector's institutional framework including the gradual erosion of ESCOM's commercial and management autonomy. However, soundness of the institutional framework and financial performance were left to the legal covenants of the Development Credit and Project Agreements. Project implementation showed that this approach was not sufficient, as supervision could not overcome the institutional and financial weaknesses.

Another risk that the project could have attempted to mitigate more rigorously was the risk of low water levels, which would seriously affect the generation capability of Malawi's hydro-dominated power system. The SAR recognized that major energy deficits could occur at any time from the mid-1990s and considered dredging the accumulated silt in the upper Shire channel linking the river to Lake Malawi to be the least cost option, requiring also the minimum time to implement, and to be acted upon when the lake level reached a pre-defined minimum trigger level. Detailed evaluation of options during the critical drought period proved dredging the channel connecting Lake Malawi to the Shire river to be a very expensive option and pumping water from Lake Malawi into the Shire River to be a cheaper solution. However, action on drought mitigating measures has yet to materialize. At project closing the major mitigating measures, the Shire River pumping project and the interconnection with neighboring countries, were only at an inception and initial negotiations stage, respectively. The regional experience of the impact of drought for power generation and the drought experienced in Malawi in 1994/95 suggests the critical need to diversify power supply sources.

Finally, project design could have been improved with more realistic assessment of the Government's capacity to manage the non-power components. During implementation it became evident that the Government was not fully committed to these components. A clear agreement with Government during appraisal on the objectives of the policy work to be financed under the project might have provided more focus during implementation.

4. Achievement of Objective and Outputs

4.1 Outcome/achievement of objective:

Assessment of the project's achievement of its objectives gives a mixed picture. On balance and considering that ESCOM's decline raises serious concerns about the sustainability of the project in the longer term and the utility's ability to expand electricity access, the achievement of the overall development objective is unsatisfactory. The achievement of the specific objectives is as follows:

(a) Meeting the growth in demand for power in a least cost manner. This project objective was partially achieved with the commissioning of the Kapichira hydroelectric scheme, which was the least cost generating plant. It came on line at a moment when the power system's reserve margins had fallen practically to zero, increasing ESCOM's installed hydro generating capacity by 30 percent, from 196 to 260 MW, and its energy production capability by about 40 percent, from 926 GWh to 1330 GWh per year. The plant will make a substantial contribution to electricity supply in the country when demand growth picks up. Kapichira created an initial energy surplus situation because of lower than expected growth in electricity demand. However, from a system operations perspective, the project provided critically needed capacity, which would allow ESCOM to better serve peak demands and operate the system more efficiently. The low reliability of the transmission and distribution systems will continue to constrain the quality of service until the planned rehabilitation works are completed by 2003. The generation rehabilitation also led to supply augmentation. The dredging of the regulating reservoir for the Nkula power plant recovered some 500,000 cubic meters of live storage that had been lost to sedimentation, providing a minimum of 10 GWh per year of additional energy to the system.

(b) Strengthening the capacity of energy sector institutions. This component resulted in outcomes at three levels: overall energy planning; sector reform; and ESCOM, with the following assessments.

Overall Energy Planning. The project was marginally satisfactory in strengthening the overall energy planning capacity of Government institutions. The household and biomass studies carried out under the project would provide valuable input to the National Energy Strategy which was being developed at project closing. The petroleum study was, however, of little use to the Government. The original TORs aimed to increase the security of supply after the outbreak of war in Mozambique. Following the end of the war, the situation in the petroleum sector changed dramatically and the TORs were no longer relevant. The Government decided to liberalize the importation of petroleum products and with effect from May 2000 the role of PCC has been limited to that of an industry regulator; a new parastatal company has been formed to operate oil storage facilities; all imports are being handled by the private sector; and an automatic petroleum pricing formula is being administered by a private sector committee under the chairmanship of the Malawi Chamber of Commerce. The only discretion accorded to the Ministry of Finance is a two-week period in which to challenge the calculations.

Sector Reform. Sector reform was not a specific objective of the project but became an important part of the power sector dialogue between the Bank and the Government in light of the inadequate performance of sector institutions and the recommendations by the 1996 Completion Report for the Energy I project. The main support was provided under the Second Fiscal Restructuring and Deregulation Project (Cr. 31470) while Power V acted mainly as a catalyst for dialogue and provided only limited financial support. The impact of this support was, however, satisfactory in strengthening the capacity of Government institutions to initiate the reform of the power sector. Although the reform is still far from complete and has recently been constrained by eroding social support due to macroeconomic difficulties, the Government has drafted a power Sector Policy Paper with attendant amendments to the Electricity Law. When approved, the new policy would aim at increasing private sector participation in the provision of electricity services (paras. 4.5 and 6.2).

ESCOM. The outcome of the specific components aimed at strengthening ESCOM's operations was

mixed:

- It was satisfactory for the least-cost development plan, which would contribute to the optimal development of the power system. It identified the interconnection of the Malawi system with Mozambique to be the least-cost expansion alternative, followed by a pumping station at the point where the Shire River flows out of Lake Malawi, and the installation of Units 3 and 4 at Kapichira. The government is discussing the interconnection with Mozambique and a study is in progress for the pumping project;
- It was marginal for the System Operations Model, which was intended to help in optimizing the operation of the hydro power plants. Although the Model was developed, it did not become operational since ESCOM did not provide the required information on the basic parameters for the generating plants to the consultant;
- It was delayed for the installation of a new billing system, which would improve billings and cash collections, and reduce non-technical losses. The change to the new system gave rise to problems that seriously affected the quality, reliability, and timely delivery of electricity bills. Customer complaints increased sharply and public confidence in ESCOM was severely dented. These problems were partly caused by the contractor and partly by ESCOM itself. The new billing system was not customized to ESCOM's requirements but ESCOM delayed taking decisive action towards the contractor to resolve the deficiencies that were apparent from the beginning. At project closing the outstanding problems were being resolved; and
- It was partial for financial training as two of the four accountants trained have left ESCOM for private sector jobs.

ESCOM's financial and operational performance was unsatisfactory. ESCOM was a much weaker institution both financially and operationally at project closing than it was at appraisal. During implementation its financial performance plummeted and the quality of electricity service deteriorated as illustrated by the following:

- internal cash generation fell from 26% at appraisal to about 20% at closing and fluctuated between -1% and 33 %. The target of 30% was met only for one year FY1997/98 after debt restructuring;
- debt service coverage fell from 2.5 at appraisal to about 1 at closing. The target of 1.5 was met in all years except FY1994/95 and FY1996/97 although it was only met in FY1997/98 onwards after debt restructuring;
- return on revalued asset fell from 2.4 % at appraisal to about -0.9 % at closing. It was negative during most of implementation;
- accounts receivable target was met for two years and stood at 88 days at closing instead of the expected 60; and
- network losses worsened from 15% at appraisal to around 18% at present instead of improving to 13% as forecast.

(c) Rationalizing sector-wide energy pricing policy. Achievement was unsatisfactory because electricity tariff adjustments were inadequate despite the fact that correct policy elements such as a new tariff structure and a separate (albeit not completely autonomous) regulator - the Electricity Council - were put in place in 1992 and 1999 respectively. Another improvement was the regulator's approval of an automatic tariff adjustment mechanism in 2000. The mechanism allows ESCOM to adjust its tariffs automatically to take into account movements in the foreign exchange rate and local inflation over which it has no control.

The Kwacha depreciated from about 2.9 to the dollar at appraisal to about 55 to the dollar at project closing. ESCOM has applied the adjustment formula twice since its inception, but these adjustments have not been sufficient in keeping the tariff in parity with the sharply depreciating currency.

The average tariff revenue, which was equivalent to US cents 4.3/kWh at appraisal stood at about US4/kWh cents at project closing, compared to the projected tariff in the SAR of about 7.0 US cents/kWh for 1998/99. The inadequate adjustment of electricity tariffs to cost recovery compromised ESCOM's financial performance and prevented it from meeting the project's financial covenants and its debt service obligations.

(d) Environmental and Social Outcomes. Though the environmental and social outcomes were not listed as a specific project objective in the SAR, they are worth highlighting because this was the first project in the Africa Region which was subject to a full Environmental Assessment and because the implementation experience was very good. There were a number of benefits that materialized through the management of the environmental and social aspects of the project and these went well beyond the limits of the site specific/construction related mitigation:

- income generation for local communities which participated in environmental mitigation activities;
- strengthening social cohesion by respecting women's cultural rights;
- increased access to education, health facilities, and potable water;
- improved wildlife management and park services including protection, monitoring and research; and
- enhancing ESCOM's environmental and social records and documentation thereby ensuring sustainability of the mitigating measures.

4.2 Outputs by components:

A. Power Component

Kapichira. The hydroelectric plant with a total generating capacity of 64 MW together with associated transmission was completed according to specifications in July 2000.

Generation Rehabilitation. The dredging of Nkula's regulating reservoir was completed in July 1999 and the spare parts for the Nkula B hydro power plant were purchased in 2000.

ESCOM's Institutional Development Component. The outputs were: (i) a least-cost system development plan for 2000-20015 and corresponding investment program; (ii) a System Operations Model to help improve the operation of the cascaded group of power plants, especially during drought periods; (iii) a strategy for the Management Information System; (iv) a new computerized billing system and 18 computers; and (v) training of 25 technicians and engineers, and 4 accountants.

B. Non-Power Components

Energy Planning and Policy. The Household Energy Survey and the Biomass Marketing and Production Study were completed in 1996 and 1997 respectively.

Petroleum Supply Study. The Petroleum Supply Study was completed in 1999.

4.3 Net Present Value/Economic rate of return:

The ex-post economic evaluation has broadly followed the methodology used in the SAR, though it has been modified to take into account the changed configuration of investments due to the cancellation of the transmission and distribution rehabilitation and thus economic benefits. The ICR re-estimated the ERR at about 11% assuming an electricity demand growth of 5 % per year. If the annual growth was only 4%, the ERR would drop to 10%. In comparison, the estimated ERR in the appraisal report was 16.1%. The difference between the ERR estimates can be explained by the lower than expected growth in electricity demand, and the cancellation of the transmission and distribution components, and thus the benefits associated with these. The resultant impact was moderated by the lower than expected capital cost of Kapichira (Annex 3).

4.4 Financial rate of return:

The SAR did not calculate a financial rate of return for the project.

4.5 Institutional development impact:

The project's overall institutional development impact was modest. It was generally satisfactory in helping ESCOM in technical areas but failed to achieve the intended outcomes in the financial and managerial areas as discussed in paragraph 4.1 (ii). The implementation of the project improved the capacity of ESCOM staff to design and manage a complex hydropower project. The training provided by the contractors will help ESCOM to operate Kapichira, as it provided hands-on experience for technicians and engineers in the course of its construction and commissioning. The least-cost planning study will help system planning. The consultants did the study mostly in Malawi to maximize transfer of skills and made the software and hardware available to ESCOM staff for generation and transmission planning and for demand forecasting. Finally, the project made a significant contribution to improving the capacity of ESCOM and other Government agencies to design, implement, and monitor environmental and social impacts of hydropower projects.

The project's impact on building institutional capacity in overall energy and power sector reform was higher. Building on the assistance provided under the project and the Second Fiscal Restructuring and Deregulation project (Cr. 31470), the Borrower has drafted a paper on the Government's Power Sector Policy aimed at increasing private sector participation, and is in the process of finalizing a paper on the country's overall Energy Policy. As part of this process, Government carried out public consultation processes in June 1999 and in September 2000. The major elements of the policies were debated amongst the stakeholders. Cabinet discussion on the Power Sector Policy is scheduled for December 2000 and on the Energy Policy for mid-2001.

See also paragraphs 4.1 (ii) and 6.2

5. Major Factors Affecting Implementation and Outcome

5.1 Factors outside the control of government or implementing agency:

Project implementation coincided with a turbulent period in Malawi's history linked to the onset of a multi-party democracy. The period that followed saw the country building up its democratic institutions, and implementing policy and economic reforms. The Government's economic reform program during the 1990s had mixed success arising from both internal and external developments and resulted in an economic environment very different from the SAR assumptions. The structural reforms have created a far more open and competitive economy compared to the early nineties. The Government, however, had less success in restoring and sustaining macroeconomic stability. While the long term trends show improvement during the 1990s, there have been sharp year-to-year fluctuations. GDP growth is marked by wide swings ranging

between 7.3% in 1996 to 2% in 1998. These have continued to stifle the growth prospects of Malawi's small but potentially dynamic private sector. The massive devaluation of the Kwacha started in the run-up to elections in 1994 when the exchange rate was allowed to float, and became the beginning for the accelerated decline of ESCOM's financial difficulties. The exchange rate depreciated again sharply in 1998 and consumer price inflation registered a marked increase driven by this devaluation. Since June 2000, inflation has begun to rise again and there has been a sharp depreciation in the exchange rate due to: (i) falling tobacco prices and quality, and rising oil prices; (ii) delays in donor disbursements; (iii) devaluation of the South African Rand, and the Zimbabwean dollar; and, (iv) slippage in monetary policy resulting in an expansion in money supply.

Government had little control over the following factors that postponed the construction of Kapichira:

- Inability of the AfDB to meet its financing commitments to the project following credit effectiveness;
- Design changes;
- The main civil works bid document had to be redone to include two alternatives for dam design, following a recommendation of the Panel of Experts;
- The civil works contractor's delay in mobilization of the needed equipment to site;
- The prolonged drought that began in 1994/1995 and its attendant impact on generation and, in turn, on ESCOM's sales revenues; and
- The disruption of ESCOM's operations due to the tragic loss of staff from HIV/AIDS related complications.

5.2 Factors generally subject to government control:

Government had control over its main role in the project, which was to make sure that the implementing agencies had the institutional support and financial means to implement the project as agreed with IDA. Increased politicization, the Government's failure to increase tariffs as needed and to cause Government agencies to pay ESCOM promptly for electricity service, as well as its undue oversight of ESCOM's operational decisions resulted in the erosion of ESCOM's financial position and management autonomy. Furthermore, the lack of political resolve to tackle the deep-rooted inefficiency of ESCOM, compounded sector problems.

Suspension of all non-humanitarian support to Malawi by the donor community because of concerns about governance was also a factor subject to Government control. During implementation, the Government's unresponsiveness in addressing donors' concerns about ESCOM's liquidity problems made it difficult to close the project's financing gap. It was only towards the end of the project that the Government's pledges to reform the power industry, following management changes in the Ministry of Finance, made the donors willing to consider financing of the distribution and transmission components.

The Government also was responsible for inducing the appropriate Departments to produce the policy studies under the project's non-power components. The start-up of the studies was delayed due, in part, to the reorganization of the implementing agencies and, in part, to changes in senior staff following the inauguration in 1994 of the newly elected Government. Government ownership of these components weakened further following the disbandment of the Ministry of Energy and Mines in 1998. Although the household and biomass studies were completed, the Government did not put in place clear channels of responsibility, which hindered coordination and subsequently deferred necessary follow-up.

5.3 Factors generally subject to implementing agency control:

ESCOM had control over the completion of the project's power component and the maintaining of sound technical, financial, and managerial capacity to sustain the viability of the investments. As discussed in

paragraph 5.2, the company only had partial control over its revenue levels. Nonetheless, ESCOM was in a position to put in place proper financial controls to cut out waste and inefficiencies but it did not do so despite advice from the Bank. Currently ESCOM has not been able to close its accounts, seven months after the end of its financial year. Yet, it has shown no urgency to initiate procurement of accounting assistance for its business units, which the Bank has agreed to finance under the Utility Reform and Privatization project (Cr. 3395).

It also allowed non-technical system losses to increase and service delivery to deteriorate and it did not take adequate measures to improve its collection performance. Because of the lack of focused and timely action by ESCOM's management to address the apparent problems with the new billing system, its implementation was protracted and caused the utility financial and consumer relations problems. More importantly, lack of management coordination and the piecemeal internal restructuring of the utility put a heavy toll on its performance and staff morale.

ESCOM was responsible for the procurement for the power component. Although it performed satisfactorily for most of the sub-components, it failed to procure sedimentation monitoring equipment and the spare parts for the power plants even though the Bank had agreed to finance them. There were also delays in the procurement process of the contract for the generators due to issues concerning prequalification of a bidder which were eventually resolved in favor of the bidder. The same bidder submitted a low bid for the generators which were, however, large for accommodation in the powerhouse. ESCOM accepted the recommendation of the Engineer to declare the bid non-responsive. The Bank's intervention for a qualitative evaluation rather than a somewhat subjective approach resulted in the selection of another bidder as being the lowest responsive bid. As a result, the procurement process from bidding to contract award took about eleven months.

5.4 Costs and financing:

The total cost of the project was about US\$140 million compared with the SAR estimate of US\$231 million. The difference is partly due to the cancellation of a number of project components. The cost of Kapichira was about US\$131 million compared to the appraisal estimate of US\$179 million. IDA financed about US\$54 million, EIB US\$20 million, KfW US\$18 million, CDC US\$24 million, and FMO US\$5 million. ESCOM contributed about US\$18 million equivalent in local costs. In addition, SIDA, NDF, and NORAD are financing the reinforcement of the transmission and distribution networks, which were canceled from the project in 1998. Their combined commitment is about US\$24 million.

6. Sustainability

6.1 Rationale for sustainability rating:

The sustainability of the project is unlikely, unless the viability of the power sector is restored to ensure efficient operation and maintenance of the power plants. Even though the physical assets will provide tangible benefits for many years ahead even without proper maintenance, their long-term sustainability will require that the sector is operated on commercial principles. Implementation of the Government's recently initiated reform program, including sector restructuring and increased private sector participation would provide the elements needed for sustainability.

The sustainability of the Nkula reservoir dredging depends on environmental factors. Because of the expanded farming activities and deforestation along the catchment area for the Shire River, the risk of sedimentation build-up is greater now than it was at appraisal. To improve sustainability, the project purchased equipment and trained ESCOM staff to continue the removal of silt accumulations as may be needed during the lifetime of the project. In addition, the project provided funding for equipment for the

monitoring of sedimentation upstream, but ESCOM did not purchase it despite the urging of the Bank. Although ESCOM's efforts in controlling and preventing sedimentation are crucial, the only permanent solution is the improved management of farming activities and reforestation along the river. IDA is supporting such a development under the Environmental Management project (Cr. N-025).

6.2 Transition arrangement to regular operations:

The Government has taken initial steps to reform the sector, which, if followed through, would unlock many of the shortcomings that constrained implementation and would enhance the sustainability of the investments. The new Electricity Law, enacted in 1998, provided for private sector entry into the sector and the establishment of an electricity regulator (the Electricity Council). Recently, the Government has realized that the Law is inadequate in attracting private participation. In particular it does not provide adequate clarity on licensing and tariff setting procedures and there are issues on the autonomy of the regulator. On this basis, a new Law and a Power Sector Policy paper have been prepared and are scheduled to be submitted to the Cabinet for consideration by the end of 2000. Under the new policy, power sector activities would be organized according to functional lines into separate generation, transmission, and distribution businesses. The power distribution business would be divested to the private sector following a detailed study on suitable options.

The Public Enterprises (Privatization) Act passed in 1996 laid the legal basis for implementing the privatization program of Government assets. The Government approved a Divestiture Sequence Plan (DSP) for 100 public enterprises in 1997. The DSP has slated ESCOM for privatization in a phased manner with the support of the Privatization and Utility Reform Project, approved in June 2000. This project would assist the Government with the necessary studies and due diligence work. The strategy for privatization is still under discussion and has not received political approval. In the interim, Government is considering strengthening ESCOM's management and board.

7. Bank and Borrower Performance

Bank

7.1 Lending:

The project was based on a detailed least cost development plan and engineering studies. The focus on the physical objectives of improving the power system was consistent with Government's investment policy and the Bank's country assistance strategy. The project was also consistent with the Bank's energy sector strategy at the time of appraisal, which emphasized least-cost development of infrastructure (The Bank's new Power Sector Policy, focusing on commercialization of power utilities and regulatory reform was developed in 1993). The skill mix of the appraisal mission was appropriate for the project. The Bank's assistance to ESCOM in preparing the physical components was satisfactory and the working relationship was good. The SAR was detailed and well prepared, identifying project risks and performance monitoring guidelines.

The project's economic analysis incorporated the main risks, which were the underestimation of capital costs, overestimation of demand growth, and implementation delays. In retrospect, it is clear that even the "low case" demand forecast used in the sensitivity analysis was over-optimistic. The base case assumed an annual demand growth of about 7%, which was similar to the actual increase in ESCOM's sales during the period 1985 to 1989, while the sensitivity analysis was performed on a 20% lower growth, i.e. on an average annual growth of about 5.6%. The actual sales increased on average was only 3.6% per year during the period from 1991 to 1999.

In hindsight, there were two areas where the Bank could have been more forward looking: co-financing and tariffs. In regard to co-financing, it would have been beneficial to minimize the gap before presenting the

project to the Board. In regard to tariffs, a clear implementation plan could have been agreed with Government, including some form of adjustment mechanism to respond to currency fluctuations and ensure marginal cost coverage. As it happened, these two issues became the major themes of implementation. The financing gap caused a significant delay in effectiveness and the Bank had to waive the cross effectiveness conditionalities of the Development Credit Agreement (DCA) to declare the Credit effective. Eventually, the Bank had to cancel the un-funded transmission and distribution rehabilitation components, thus impeding the achievement of the project's reliability and system efficiency objective.

7.2 Supervision:

Over the six years of project implementation, there were about 2 missions per year in conformity with the supervision plan in the SAR. Regular supervision teams included a Power Engineer, a Financial Analyst, an Economist, and in the final years also a Financial Management Specialist and an Infrastructure Officer, both from the Resident Mission. Environmental and Resettlement Specialists visited the site as required to review implementation of the environmental and social mitigation measures. Although there were two changes in the team leader, transitions were smooth because of the continued participation of the same power engineer and financial analyst. The staff at the Resident Mission provided effective support during and in between missions. Coordination with the project's co-financiers and other power sector donors was good, deepening towards the end of the project in an effort to harmonize donor support to the power sector. The project's quality assurance plans were adequate. They made effective use of the Energy Sector Board staff, Procurement Advisor, and the Africa Region's Quality and Knowledge Management staff. The Africa Region's legal and procurement staff provided support in pertinent matters and senior management took the lead in policy dialogue.

Follow-up letters to supervision missions were regularly prepared and transmitted to the Government and ESCOM alerting them to the key issues with project execution and suggesting corrective actions in conformity with Bank procedures. Aide Memoires and the Project Status Reports effectively reported on progress and lack of progress and adequately justified the project's performance ratings both in terms of achievement of development objectives and project implementation. Following three years of "Unsatisfactory" ratings, the achievement of the project's development objective was upgraded to "Satisfactory" in October 1999, after the Government had shown increasing commitment to the project through the implementation of agreed actions such as initiating the financial restructuring of ESCOM, payment of electricity arrears by the Army, Police, and the State Residencies, and initiating the preparation of a Power Policy Statement. In addition, the Electricity Council approved a 15% tariff increase and the use of a tariff adjustment mechanism to allow for unforeseen movements in the exchange rates. With these improvements, ESCOM's financial position was forecast to improve markedly. The rating had to be downgraded to "Unsatisfactory" after the final supervision mission in May 2000, because the actions did not produce the expected improvements in ESCOM's performance due to lack of financial discipline, increased expenditure, lower revenue collection, and reduced sales, and follow up actions were yet to be implemented.

During the latter part of implementation, supervision focused on the institutional and financial performance because ESCOM's liquidity problems and the erosion in the quality of supply would potentially undermine the sustainability of the project. The Bank provided assistance with the identification of potential problems, suggestions and guidance to implementing agencies for proactive or corrective actions. The Bank repeatedly raised the issues of tariff reform and improved management of the financial and commercial aspects of ESCOM's operations and provided detailed advice on available options. In view of the political considerations associated with such issues, the relationship between the Bank and the Borrower was sometimes difficult. However, even though the necessary measures were not always taken, the Bank did not use its remedies under the credit agreement, but emphasized negotiated solutions instead, so as not

to disrupt the construction of Kapichira. In retrospect, it would be tempting to conclude that the Bank could have been more proactive in applying its remedies, particularly during the first years of project start-up when no contracts had been signed and, despite the Bank's repeated requests, the Government had failed to take the actions needed to comply with the agreements reached under the Project. The Bank's action should, however, be seen in a larger context -- it would have been difficult to take strong action with a new democratically elected government for the first time in 30 years. Later on, after the main construction contracts had been signed, suspension of the project would arguably have caused significant disruptions of the physical progress in dam construction and also distressed relations with co-financiers. The Bank demonstrated proactive supervision through stopping the proposed Supplementary Credit to finance the transmission and distribution components because ESCOM's financial viability was not restored and through intensive dialogue with the Borrower and the careful management of the extensions of the closing date.

The credit was extended twice. In March 1998 the Government requested a two year extension of the credit closing date, from June 30, 1998 to June 30, 2000, to make up for the 18 month delay in effectiveness. After the Government had met the extension conditions including a 35% tariff increase, conversion of ESCOM's unpaid debt service due to the Government to equity, and submission of a new Electricity Bill for Parliament approval, the Bank extended the credit for one year only because additional measures were needed to put ESCOM on firmer financial footing. In 1999, the Bank extended the credit for the second year following the Government implementing the agreed actions and the subsequent upgrading of project performance to "Satisfactory" as discussed above. The need for these extensions was implicit in the fact that: (i) effectiveness was delayed by 18 months which meant that an extension was necessary just to keep to the original length of time estimated for construction of Kapichira (ii) the conditions that were put and met for each extension; (iii) the various changes which led the Bank to hope things would improve (restructuring and corporatization of ESCOM; financial restructuring; management changes etc.); and (iv) perhaps the concerns regarding the costs (literal and reputational) of stopping Kapichira midstream. The Bank's conditions for the second extension, including improved financial performance, were not well taken by the co-financiers, who were concerned that such conditions could potentially delay the construction of Kapichira.

In consultations with the co-financiers, the Bank did not extend the project a third time, as requested by the Government, owing to continued unsatisfactory performance in meeting the agreed legal provisions in the credit agreements. The project closed on June 30, 2000. Recognizing, however, the Government's proposed efforts to improve project performance, the Bank agreed to consider additional financing to cover any needed work after the closing date if concrete actions were taken within three months after project closure. Subsequently, the Government started the process of recruiting a new management team for ESCOM, but had not completed it by the time of writing this ICR.

7.3 Overall Bank performance:

Although the Bank could have been even more proactive in the early years of implementation, considering the intensive supervision towards the end of the project and careful management of the closing date, Bank performance, on balance, was satisfactory.

Borrower

7.4 Preparation:

ESCOM was strongly committed to the hydropower component of the project. It had a team of committed and capable people working closely with the Bank in the preparation of the project. The Government, on the other hand, lacked a similar sense of commitment to the project's non-power component, and was thus a weak partner of the Bank during project preparation.

7.5 Government implementation performance:

The implementation performance of the Government was unsatisfactory because it did not take the lead in keeping the project on track. In particular, it did not convey a sense of urgency to improve the financial and operational performance of ESCOM despite increasing black-outs and service disruptions. In 1999, Government did, however, take major steps towards securing the financial sustainability of the sector; in addition to a tariff increase, the Government initiated the financial restructuring of ESCOM by converting a portion of its debt to Government to equity in lieu of a larger tariff increase. Largely because of the sector's inefficiency, this did not lead to expected outcomes.

The Government did not take full ownership of the project's non-power components. Only at the end of the project did the Energy Department, reenergized under its new parent ministry, the Ministry of Environmental Affairs and Natural Resources, take action in developing an energy policy.

7.6 Implementing Agency:

ESCOM's Project Management Team and its Environmental Unit performed satisfactorily. The Project Management Team played an active role during implementation, interacted professionally with the Bank, co-financiers, the Panel of Experts, and contractors, and produced progress reports with the agreed frequency and quality. The exception was the billing system where lack of experience, over confidence on the contractor, and lack of senior management support and clear transition guidelines delayed its commissioning. Management and execution of the environmental and social mitigation measures were highly satisfactory. (See Additional Information on the environmental and social aspects in Section 10).

ESCOM's overall operational and financial performance was inadequate. It was frequently not in compliance with the credit covenants and it deferred maintenance expenditure and accumulated payment arrears to lending institutions. ESCOM's financial crisis results from a political and corporate governance issue, a tariff reform issue, and an internal management issue. Several senior management changes, lack of synchronization of management activities, and the non-coordinated implementation of the utility's internal restructuring adversely affected the Corporation's operations and the morale of its staff. It did also not make best use of the assistance and advice offered by the Bank and the co-financiers to improve its administrative and financial practices.

7.7 Overall Borrower performance:

Considering the above, especially the continuous deterioration of ESCOM, the Borrower's overall performance was unsatisfactory.

8. Lessons Learned

Project Lending

- Delays in obtaining committed cofinancing seriously impacted the outcome of this project. The ICR therefore proposes that cofinanciers should participate in project preparation beginning from pre-appraisal, at which time a cooperation strategy, sanctioned by the senior management of the cofinancing agencies, should be prepared and agreed upon. Cofinanciers should also participate in the appraisal and negotiations of the credit where conditionalities will be tuned to ensure timely implementation of the project. During negotiations the co-financiers should also agree on the kind of support they will provide to the supervision of the project.
- The subdivision of the project into numerous contract packages because of co-financing considerations led to coordination problems during implementation.

- The project demonstrated clearly the linkage between the achievement of the project's development objectives and policy reforms. Key reforms, such as those relating to tariffs and institutional framework should be assessed thoroughly at appraisal and agreement on a reform platform should be sought before implementation begins to ensure Borrower ownership. Investment project conditionality is a weak vehicle to promote an appropriate institutional framework. Commercialization and private sector participation should be pursued in parallel as part of the overall macroeconomic framework. This is now being done through the recently approved Privatization and Utility Reform project.
- Energy lending to Malawi should focus on the following four priorities: expanding access to modern energy; increasing private participation to reduce the fiscal burden of the energy sector; improving reliability; and increasing regional integration and energy trade.

Supervision

- A flexible attitude in reallocating funds when circumstances changed was critical in achieving satisfactory outcomes. The Bank reallocated funds to cover a portion of the financing gap and thus helped the project in achieving its most critical generation rehabilitation objective. The financing provided for advisory services for sector restructuring, even though this was not a specific project component, helped the Government to initiate the reform process.
- If environmental and social mitigation measures are adequately designed and implemented, a sector investment project can contribute significantly to improving the living standards of the population beyond the project area. The project also demonstrated that a participatory approach to the implementation of environmental and social mitigation measures created a trust between the implementing agency and the project-affected people and local communities and thus contributed to the successful outcome.
- The implementation of initial sector reforms is not an indicator of government ownership and without political consensus the pace of reform will be slow. The creation of a separate electricity sector regulator was not supported by social and political commitment to reform, which compromised its autonomy and thereby its impact on the economic regulation of the sector.

9. Partner Comments

(a) Borrower/implementing agency:

Electricity Supply Corporation of Malawi Limited (ESCOM):

INTRODUCTION

The Malawi Power V Project as envisaged and consolidated at appraisal by the World Bank in consultation with the Project and Cofinanciers comprised Power and Non-Power Components. The Power Component included Kapichira Hydro-electric Power Scheme; Generation Rehabilitation; Transmission Reinforcement; Distribution Reinforcement and Institutional Strengthening of ESCOM. The Non-Power Component consisted of Energy Planning and Policy; Petroleum Supply and Energy Efficiency on wood fuel resources. The Electricity Supply Commission of Malawi (ESCOM) was the Executing Agency for the Power Component of the Project.

BACKGROUND

A study to determine the Least Cost Power Development Programme was initially commissioned in 1984 and was carried out by Messrs. Tippets-Abbot-McCarthy-Stratton (TAMS) Inc. of the United States of America. The study examined a full range of options, both hydro and non-hydro power generation. The hydro options included a review of electric power development potentials on the main rivers in Malawi including the South Rukuru, the Bua and Shire Rivers. This study essentially concluded that hydro-power development should continue on the Shire River with candidate development projects identified as Kapichira, Tedzani III, Mpatamanga, and Kholombidzo hydro schemes, to be developed in that chronological order.

However, in 1988, following a further study carried out by Kennedy and Donkin of the United Kingdom to review the Least Cost Power Development Programme, with particular attention on the ranking between Kapichira and Tedzani III demonstrated and concluded on the basis of least cost that Tedzani III should be implemented before Kapichira. Tedzani III was therefore implemented earlier, under the Energy I Project.

The Kapichira hydro-electric power scheme was to be implemented immediately after Tedzani III in two phases. Through optimization in the feasibility studies carried out and concluded by TAMS in 1993, the scheme would have a total capacity of 128 MW comprising 4x32MW generating units when fully developed.

Further review of the entire ESCOM system concluded that the development of the hydro-electric power generation should be supplemented by rehabilitation of the old existing generation plants. It was also deemed necessary to reinforce the transmission and distribution networks to complement the power generation.

PROJECT OBJECTIVES

Primary objectives of the Power Component of the Malawi Power V Project were to: (i) increase the electric power generating capacity in order to meet the increasing demand for electric power up to the turn of the century and possibly beyond (up to 2003), through the construction of the Kapichira Hydro-electric Power Scheme; (ii) improve the electric power generation reliability and enhance generation capacity through rehabilitation of the existing old hydro, standby gas and diesel power plants; (iii) improve the quality and reliability of the power supply through reinforcing the transmission and distribution system; and (iv) strengthen the institutional capacity of ESCOM through training of personnel and computerization of financial and technical operations.

PROJECT IMPLEMENTATION

1. Project Launch

Due to a number of factors, the project launch was delayed by about 18 months until 1994. Before the project could be launched, donor Support to Malawi had been frozen owing to issues of political governance of the then regime prior to the democratization process. Another factor that contributed to the delay was the withdrawal of the African Development Bank (AfDB) from co-financing the civil works. This development created a financing gap. As a pre-condition to the effectiveness of the funding agreements, it was required that the ESCOM tariff be adjusted upwards, but this tariff adjustment was not granted by the Government in good time, and therefore delayed the effectiveness of the funding agreements.

2. Kapichira Hydro Electric Power Scheme

a. *Engineering.* The Engineering Consultancy Services for the project were entrusted to Messrs. Tippetts-Abbott-McCarthy-Stratton (TAMS) Inc. of the USA, in joint venture with Knight Piesold Limited of the United Kingdom and in association with Merz Maclellan, also of the United Kingdom. The Consultancy services were divided into three stages. The Contract was awarded in December 1992 and the services commenced in January 1993, prior to the official project launch. These were financed under the IDA Project Preparation Facility.

b. *Procurement.* Construction works for the project were split into several packages, each constituting a separate contract. The first two lots comprised advance infrastructure works, namely: Contract KAP46: Access Road and Bridge; Contract KAP-07: Housing and Infrastructure. The advance infrastructure works, especially the access road and bridge, were on a 'critical path' and, as such, they had to be awarded as early as possible. The whole process of tender documentation for various packages, right from prequalification documentation, took too long because of the requirement for review; of the documents by numerous funding institutions, each requiring to be satisfied before giving a no objection to issue invitations for bids.

When the bids were received, ESCOM proceeded to evaluate the bids in consultation with the Consulting Engineer. However, the funding institutions also played a very active role even in the detailed analysis and evaluation of the tenders. Whereas it was a normal requirement that the financiers' consent would have to be obtained prior to award of contracts to the recommended bidders, in one case this proved to be a big impediment to the procurement process.

c. *Performance of Contracts.* In the original construction planning, at the end of feasibility studies, the programme had assumed award of the Advance Infrastructure Contracts in March 1994, followed by award of the Main Civil Works in July 1995. With such a programme, commissioning of Unit No.1 was foreseen to take place in August 1998 and of Unit No.2 in November 1998. However, due to delays experienced prior to contract awards, the project programme had to be revised. The change in contract award and commencement dates heralded potential problems in the scheduling of the site activities and in trying to mitigate the impact of this on the original completion dates, a revised programme was hurriedly worked out which in effect used up the much needed buffer times between activities.

The most significant delay during the project implementation was the main civil works, in particular, the powerhouse excavations. For no apparent reason, the powerhouse excavations and subsequent construction works extremely dragged and prolonged and this consequently derailed the entire project programme. This project derailment had extremely adverse knock-on effects on the subsequent installation of the electrical and mechanical works.

In an analysis of the problems causing the delays at this stage of the project implementation, it became apparent in the opinion of ESCOM Project Management that the Main Civil Works Contractor had not mobilized adequate suitable equipment to carry out the works. This was evidenced by the construction through-put being much lower than indicated in the bid. It was also evident that in certain cases, the approved construction methodologies were not being adhered to. Another observation was that the site construction team did not have the much needed home office support in time of need.

During equipment installation, various installation activities had to be re-scheduled as dictated by the progress on the civil works. As time went by, each contractor was inclined to rush to complete their part of

the works without regard to the essence of equipment interfacing. This made coordination of various contracts by the consulting engineer very critical and no easy task. The project programme eventually became irrelevant for the day-to-day monitoring of site activities progress. Instead, the Consulting Engineer devised a Coordination programme which was being reviewed on a monthly basis.

General cooperation amongst the contractors was also lacking at times. This was so either because each contractor was only concerned about safeguarding his own contract, in a crisis situation, or merely a problem associated with difference of nationalities. Some contractors would even demobilize from site temporarily until they arbitrarily decided that there was enough work to warrant their presence on-site, despite there being plenty of other works to keep them busy in the opinion of the engineer.

d. *Design Changes During Construction.* The basic design concept for this project remained the same until completion. However, certain design changes to specific civil structures and electro mechanical equipment, recommended by either the Panel of Experts or the Consulting Engineer or even proposals made by the Contractors, were taken into account and implemented, as necessary, after careful review. Such changes either improved the quality of the finished works, improved the performance of the installed equipment or simply yielded economic benefits to the project. Some of the notable design changes were cofferdams and training dike, main embankment dam, tunnel and shafts, surge chamber, powerhouse and tailrace, main access road, turbines, cranes, ventilation and air conditioning system, generators, GIS substation equipment, transformers, and general electrical equipment.

e. *Commissioning.* Dam commissioning and reservoir impounding was accomplished between October and November 1999. Commissioning of the generating units commenced in May 2000 and continued until June 2000. Finally, the actual Unit On-Line and Commercial Operation dates for the generating units were achieved as follows:

Unit No. 1	On-Line	June 14, 2000
Unit No. 1	Commercial Operation	June 22, 2000
Unit No. 2	On-Line	June 30, 2000
Unit No. 2	Commercial Operation	July 07, 2000

The official inauguration of the Kapichira Hydro-Electric Power Scheme took place on September 30, 2000.

f. *Operation.* The Kapichira Hydro-Electric Power Scheme is now fully operational. In preparation for the operation, a comprehensive training programme was incorporated in the project implementation, from design through procurement, construction and commissioning. ESCOM engineers and technicians underwent training with the equipment manufacturers and suppliers at their head offices and factories, and on-the-job training during installation on site. The trained personnel are now operating the station and with operation and maintenance manuals provided by the equipment suppliers the ESCOM personnel is well equipped to undertake any necessary maintenance during the life of the plant.

ASSESSMENT OF THE PROJECT

Achievement of Objectives. With completion of Kapichira phase I, an additional 64 MW to the electricity generation system has been realized, thereby increasing the total generation capacity from 218.5 MW to 282.5 MW. This development has been just in time to meet the growing demand for power, otherwise the system was without any reserve margin due to delayed implementation and late completion of the project.

Dredging of the Nkula reservoir, as part of the generation rehabilitation, restored partially the lost pondage capacity of the reservoir, and this yielded tangible increase in the machine output. Complete rehabilitation of the hydro and thermal plants to improve their availability has been beset by funding constraints. However, over the years, ESCOM has continued to undertake limited rehabilitation through maintenance programmes using own internal resources. Currently, some funding has been obtained from KfW and the funds will be used to purchase essential spares for Nkula 'B' machines only.

Due to funding constraints, the Transmission and Distribution Rehabilitation was never carried out under the Project. Nevertheless, ESCOM has over the years carried out ad hoc rehabilitation of the transmission lines to just maintain acceptable levels of quality of power supply. Now that Kapichira is completed, more effort is being made on rehabilitation of the transmission lines and distribution network. Otherwise the specific objective of improving the quality of power supply as envisaged at appraisal of the project has hardly been accomplished due to lack of funding for this component.

As part of institutional strengthening of ESCOM, some limited training has been carried out under the project. In one case, training was done through attachment of ESCOM staff to the consulting engineer who was assigned to carry out a study to determine the Least Cost Power Development after Kapichira Phase 1.

The envisaged Management Information System has not been fully implemented; this again being due to lack of funding. In fact, only computerization of the Billing System has been implemented under the Project.

PERFORMANCE OF PARTICIPANTS

a. Funding Institutions : The following funding institutions participated in the project : World Bank (IDA), European Investment Bank (EIB), Kreditanstalt für Wiederaufbau (KfW), Commonwealth Development Corporation (CDC), and Nederlandse Financierings-Maatschappij voor Ontwikkelingslanden (FMO). The local component was funded by ESCOM.

Throughout implementation of the project, the funding institutions participated with considerable zeal. Their commitment was demonstrated right from works and equipment procurement through their participation in tender documentation and evaluation processes. During construction, the funding institutions maintained a close monitoring of the project through progress reports submitted by ESCOM Project Management in collaboration with the Consulting Engineer. Periodic supervision mission visits were also conducted as part of their project supervision and monitoring. All these were commendable efforts on the part of the funding institutions in trying to steer the project in the right direction to achieve the set objectives.

It was very unfortunate, however, that in spite of being very close partners in the project implementation, and of all the funding institutions the World Bank, a lead partner, failed to appreciate the problems that the project encountered. During the supervision mission visits the Bank was thoroughly apprised of the status of the project and well informed of the problems being encountered in all aspects of project implementation.

Together, the Bank and the Executing Agency would discuss the problems and decide on appropriate remedial measures. Most of the problems during implementation arose from coordination difficulties of multiple contracts. Apart from equipment interfacing difficulties, the difference of nationality amongst contractors had a considerable bearing on the coordination problems. This problem had been alluded to during the Bank's and other co-financiers' supervision visits. The re-arrangement of the financing plan

which necessitated splitting up the generating equipment into separate contracts for generators and turbines was another factor that caused delays at the tendering stage.

In view of the numerous problems cited above that caused delays on the project, the Bank, having played an instrumental and active role in the process, should have considered an extension to the closing date of the Development Credit Agreement, especially considering that the project was, at the time, nearing completion.

Whereas the reasons for closing of the Development Credit Agreement were said to be non-compliance by the Government and the Executing Agency with performance requirements, the Bank should have taken cognizance of and considered the fact that at the time the implementing agency, ESCOM, was being asked to restructure and commercialize, preparing for possible privatization. This exercise demanded considerable effort and resources in terms of time and finance, among others, at all levels of Management, and the time frame given, i.e. by 31 March 2000, was too short.

The processes of restructuring and commercializing were an unfamiliar development and in the absence of clear guidelines, ESCOM was literally groping in the dark. The organization was thrown into disarray and lost focus on the normal operations and hence affected its performance adversely, including focus on the Project.

Whereas the Bank and other co-financiers had been good partners, with a common goal to see the project through to successful completion, the Bank's action with regard to the closing of the Development Credit Agreement was most unfortunate and contrary to the Bank's rationale for its involvement, as understood at the appraisal of the project.

b. The Borrower: The Borrower's most significant role was during negotiations for funding, up to signing of funding agreements with the respective funding institutions. The Borrower also played significant role in the approval process for contract awards. Performance of the Borrower in the above activities was quite satisfactory except where tariff adjustments were to be considered as a pre-requisite to some funding agreements. Granting and effecting of the tariff adjustments was delayed and this affected the effectiveness of the funding agreements which consequently had a bearing on the late launching of the project.

During implementation, the Borrower's participation was mostly in processing applications for disbursement for payment on goods and services. The Borrower's performance in this aspect was generally satisfactory in so far as most payments were made within the times stipulated in the contracts.

c. The Executing Agency. The Electricity Supply Corporation of Malawi Limited, formerly known as the Electricity Supply Commission of Malawi (ESCOM), was the Executing Agency for the Power Component of the Project. ESCOM played a key role right from project inception, through studies and designs and finally procurement, installation and commissioning.

The project was the first of its kind, in terms of magnitude and complexity, that ESCOM had ever undertaken. The role played by ESCOM in coordinating numerous exacting tasks at professional level, right from project inception through designs, specifications, procurement and implementation, was no easy task. The project was implemented during a time when the nation was going through economic hardship.

Against the backdrop of economic hardship and operational disruptions caused by the imposed restructuring process of the organization, ESCOM, through its Project Implementation Unit (PIU) backed by an enthusiastic and high caliber Management, was determined to proceed with the project to a successful

completion. Even for the components that lacked donor funding like generation, rehabilitation, transmission and distribution reinforcement, ESCOM endeavored to tackle the problems from its own limited resources. It would only be fair, therefore, to rate ESCOM's performance quite satisfactory, especially considering that most of the factors that affected progress on the project were not of ESCOM's own making but rather beyond ESCOM's control.

LESSONS LEARNED

Some lessons learned by ESCOM from participation in the project as an Executing Agency may be cited as follows :

- Thoroughness in project planning, right from feasibility studies leading to project inception, specification, procurement and implementation, is of paramount importance. Detailed data collection for the project design such as hydrological and geological data in the case of a hydro power project is of equally paramount importance. However, in the case of the Power V Project, lack of detailed hydrological data led to miscalculations on the design of the access road and associated culverts on river crossings.
- Attention to detail in equipment specification, especially where multiple contracts are foreseen, is very critical in order to minimize subsequent coordination and interfacing problems of various equipment which may result cost and time overruns.
- Whereas the principle of subdividing the project works into numerous packages may be considered advantageous, either in respect of price competitiveness or to have as many beneficiaries as possible from member countries of the financing institutions, care needs to be exercised to optimize and limit the number of packages in view of potential coordination problems during implementation which, like in the case of the Kapichira Project, contributed to delays and compromise in the quality of the finished work.
- In the case of civil works, post-qualification of contractors, especially with respect to their proposed equipment and experience of supervision personnel, should have been given prime consideration. What the contractor proposed at the pre-qualification and tender may not have been the same as what was actually mobilized to site.
- Thorough knowledge of the governing procurement rules and international conditions of contract is imperative for all participants in a project; the financiers, the consulting engineers, the Executing Agency, Project Implementation Unit and contractors alike. This is important for effective and efficient project management, contract administration and works supervision, in general.
- Funding institutions should develop flexibility in their rules to take into account of economic 'force majeure' that may befall the borrower nation. In such eventualities, the funding institutions should evaluate the circumstances and assist in the best way possible rather than inflict penalties for apparent non-performance caused by factors beyond the Borrower's or Executing Agency's control. The project suffered such a penalty by the closure of the IDA Development Credit Agreement.
- On a more positive note, ESCOM as the Executing Agency, has gained considerable experience both at project management level and actual hands-on on construction and operation. Such experience will go a long way in capably handling future projects.

CONCLUSIONS

The Power Component of the Project has been a partial success in so far as achievement of the objectives is concerned. Only Kapichira Hydro-Electric Power Project was completed fully to achieve the specific objective of increasing the power generation capacity to meet the increasing demand for electric power. The delay in the implementation of the Kapichira project, fortunately, did not critically affect the capacity to meet the demand for electricity. This was only fortuitous, apparently because the actual growth of electricity demand has been slower than forecast at the time of project appraisal. However, the scheme was commissioned just in time, not only to obviate the problem of insufficient reserve generation margin, but also to increase the much needed capacity to meet the increasing demand for electricity in the early part of this new century/millennium. The current Power Development Programme needs to be looked at more critically to re-assess the priorities, particularly with respect to the options between development of Kapichira Phase 2 and interconnection with the neighboring countries under the Southern Africa Power Pool Programme.

Effort should now concentrate on reviving that untackled and uncompleted power sub-components, namely: Transmission and Distribution, System Rehabilitation and Reinforcement in order to complement the increased power generation.

In the same spirit that the donor community assisted in the Kapichira Hydro-electric project, they should now come forward to support the Government's and ESCOM's efforts to rehabilitate and reinforce the transmission and distribution systems, otherwise the objective to improve reliability of supply which is critical to the Nation's development will never be realized.

The Management Information System part of the Institutional Strengthening should be revised and re-assess the scope. Implementation, of this component should also be pursued with no less vigour in order to achieve the necessary Operational Management efficiency.

(b) Cofinanciers:

KfW:

Project objectives were achieved to some degree. Kapichira power plant is in operation with only some relatively minor technical snags. However, ESCOM's financial and overall operating performance is still not satisfactory. For instance, despite tariff hike on 1 October 2000, it is not cost-covering and have rarely been so in the course of implementation. In addition, technical and non-technical losses with 17.8 % (4/99-3/00) stand above 15 % aimed at beginning of project. Projected generation demand has not been achieved either.

The design of the project as well as the design of implementation arrangements were by and large appropriate. However, earlier and more intensive donor coordination and joint supervision might have been helpful. The institutional development impact of the project is not yet discernible.

Sustainability of the project outcome and output would be likely only if sectoral reforms are implemented, i.e. ESCOM is ultimately privatized. Transition arrangements to regular operation of the project are not adequate. The consultant, for instance, is not on site any more despite a long snag list and some items, e.g. crane for trash racks not in operation/commissioned or computerized control system does not allow metering of power generation from the plant.

While the Government implementation performance was unsatisfactory, ESCOM's performance during implementation was satisfactory. In particular, ESCOM's Environmental Unit performed well during the execution of the project.

Factors outside the control of government or implementing agency that affected implementation were: (a) rainfalls and flooding in late 1997; (b) varying donor procedures on procurement and disbursement; (c) rapid depreciation of the Malawi Kwacha resulting in the need for tariff increases. Factors which were under government control, that affected implementation were: (a) late and less than required tariff hikes; (b) non or late payment of government electricity bills; (c) sluggish progress in restructuring ESCOM; (d) apparent lack of political resolve to tackle the deep-rooted inefficiency of ESCOM's top management. Factors generally subject to implementing agency control that affected implementation related to all matters relating to operational and financial performance of ESCOM not subject to those mentioned above.

EIB:

The problems due to the introduction of the new billing system arose to a large amount due to a lack of planning, combined with a complete lack of proper procedures and controls for any system modifications (change control procedures), apparent lack of proper segregation of duties, and full parallel system testing prior to implementation.

Under Lessons Learned, perhaps we should include the importance of close co-financier co-ordination. Perhaps a joint co-financier strategy could be established at the project appraisal stage, such that there is a clear mechanism for exerting (joint) pressure on Government/Institution concerned, rather than only one co-financier acting independently. This is likely to have a greater impact. The importance of ensuring that all financing is in place prior to the project starting should also be stressed.

Perhaps any important strategy (such as private sector participation) should be agreed by all parties concerned (including joint co-financiers) as a condition-precedent to financing, so that all parties concerned are aware of the future strategy, and can decide whether they wish to finance the project.

In view of some of the problems encountered with this project, could a mechanism be established whereby the co-financiers agree, at the outset of the project, that failure to meet a series of pre-defined project targets/objectives would jeopardise the financing unless the promoter was able to show that these targets/objectives had been met (within certain time delays).

(c) Other partners (NGOs/private sector):

10. Additional Information

Environmental and Social Aspects

As part of the recommendations of the EA, an environmental management unit (EMU) was established within ESCOM. The EMU at ESCOM opted for a participatory approach for the implementation of the environmental and the social mitigation measures identified in the EA. The EMU established multi-disciplinary Task Forces to ensure maximum transparency and ownership. These Task Forces included representatives from the public sector and civil society organizations, such as local government representatives from social welfare, education, forestry, land, national parks, physical planning, the labor

office, the police, and NGOs such as, the Red Cross and the Wildlife Society of Malawi. The roles and responsibilities of Task Force participants were defined and ESCOM covered the costs of these activities.

Overall, the implementation of the mitigation measures for the Project was well managed and executed. ESCOM took adequate measures to minimize the negative environmental impacts of the project. Some of these measures included: environmental protection clauses in contractors' contracts, support to the Department of National Parks and Wildlife for wildlife protection at the Majete game reserve where Kapichira is located, support to the National Herbarium and Botanical Gardens for the propagation of rare plants for re-introduction into the Kapichira site, support to the Water Department for water quality monitoring, and support to the Wildlife Society of Malawi to alleviate deforestation.

The project did not involve resettlement in terms of moving people from their homes, or their land and thus disrupting the socio-economic integrity. The social impacts were generally limited to compensating households for loss of property. Fifty-one households and their houses were moved from the right of way for a transmission line and one house was moved due to the construction of the access road to Kapichira. No house was moved more than 300 meters from its place of origin. The construction of the dam at Kapichira itself did not involve relocation. ESCOM compensated each household adequately and in excess of the Government's standard rates. ESCOM also provided the host communities with improved social welfare infrastructure including a primary school, a health clinic, a water well bore-hole, a maize mill, and a produce market. The cultural gender aspects associated with ownership of property within the matrilineal culture of the project area were respected. Based on continued supervision, the Bank's environmental and resettlement experts have concluded that people affected by the project have benefited from the implementation of the mitigation measures.

Benefits of Environmental and Social Management

The benefits of the environmental work have gone beyond the limits of the project area. The EMU at ESCOM has contributed to the overall environmental management of the project area by acting as a coordinating entity for mitigation in a multi-disciplinary manner. The EMU interventions have gone beyond the site specific/construction related mitigation and contributed to enhanced health and safety for communities, enhanced biodiversity conservation, afforestation, and enhanced community involvement in the development process. Some of these benefits include:

- restoration and/or compensation of lost or disturbed bio-physical and social environment;
- environmental awareness raising within ESCOM, within the sector, among the contractors, among national stakeholders in urban and rural areas;
- income generation for local communities who participated in environmental mitigation activities;
- restoration of livelihoods for project-affected persons;
- strengthening social cohesion by respecting women's cultural rights;
- strengthening of civil society by including NGOs in the mitigation of environmental and social impacts;
- increased access to education, health facilities, and potable water;
- improved wildlife management and park services including protection, monitoring and research; and
- enhancing ESCOM's environmental and social records and documentation.

Annex 1. Key Performance Indicators/Log Frame Matrix

Outcome / Impact Indicators:

Indicator/Matrix	Projected in last PSR ¹	Actual/Latest Estimate
1. Installed hydro capacity increased from 199 MW in 1995 to 263 MW in mid-2000.	263 MW	266 MW
2. ESCOM's debt service coverage is 1.5 in FY2001.	1.5	1.3
3. Electricity tariffs are adequate to cover financial costs and structure reflects the economic cost of supply.	6.4 US Cents/kWh in FY 2001	4.1 US Cents/kWh in FY 2001
4. Key renewable and household energy strategies implemented by mid-2000.	Program implementation is well underway.	Implementation yet to start.
5. Electricity sales increase from 730 GWh in FY95 to 865GWh in FY2001.	865 GWh	870 GWh
6. ESCOM's self financing ratio is 30% in FY2001.	30%	20%
7. ESCOM's accounts receivables do not exceed 60 days of billing.	60 days	88 days
8. Transmission and distribution losses reduced by FY2001 (measured in % of net generation).	13%	17.6%

Output Indicators:

Indicator/Matrix	Projected in last PSR ¹	Actual/Latest Estimate
1. Kapichira commissioned by mid-2000.	82% complete	100% complete
2. Nkula reservoir dredging completed by end-1999.	Completed in July 1999.	Completed in July 1999.
3. Power System Development Study completed by end-1998.	Study completed in December 1998.	Study completed.
4. New Y2K compliant billing system installed by end-1999.	Billing system installed.	Billing system was installed in December 1999 and minor problems were being remedied at closing.
5. Liberalization of the petroleum sub-sector initiated by end-2000.	Framework for liberalization in place by November 1999.	Framework for liberalization in place by end-2000.
6. 25 ESCOM staff trained by end-2000.		25 staff trained.
7. Studies on household energy and biomass use carried out.	Biomass study completed in December 1997.	Both studies completed.
8. Petroleum Study completed by end-2000.	Study completed.	Study completed.

¹ End of project

Annex 2. Project Costs and Financing

Project Cost by Component (in US\$ million equivalent)

Project Cost By Component	Appraisal Estimate US\$ million	Actual/Latest Estimate US\$ million	Percentage of Appraisal
1. Kapichira	115.20	131.52	114.17
2. Generation Rehabilitation	3.77	5.43	144.03
3. Transmission Rein.	11.66		
4. SCADA	1.32		
5. Distribution Rein.	19.92		
6. Institutional	1.92	2.07	107.81
7. Non-power Component	1.31	0.85	64.89
Total Baseline Cost	155.10	139.87	
Physical Contingencies	20.57		
Price Contingencies	55.61		
Total Project Costs	231.28		
Total Financing Required	231.28	139.87	

The total cost of Kapichira including contingency given in the SAR was US\$173.97 million, which has to be compared with the actual cost of US\$131.52 million.

Project Costs by Procurement Arrangements (Appraisal Estimate) (US\$ million equivalent)

Expenditure Category	Procurement Method			N.B.F.	Total Cost
	ICB	NCB	Other ²		
1. Works	109.27	0.00	0.00	0.00	109.27
	(61.46)	(0.00)	(0.00)	(0.00)	(61.46)
2. Goods	0.52	0.00	0.00	100.62	101.14
	(0.50)	(0.00)	(0.00)	(0.00)	(0.50)
3. Services	0.00	0.00	20.47	0.00	20.47
	(0.00)	(0.00)	(17.57)	(0.00)	(17.57)
4. Miscellaneous	0.00	0.00	0.00	0.42	0.42
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
5. Miscellaneous	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
6. Miscellaneous	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Total	109.79	0.00	20.47	101.04	231.30
	(61.96)	(0.00)	(17.57)	(0.00)	(79.53)

Project Costs by Procurement Arrangements (Actual/Latest Estimate) (US\$ million equivalent)

Expenditure Category	Procurement Method ¹			N.B.F.	Total Cost
	ICB	NCB	Other ²		
1. Works	28.20 (28.20)	0.00 (0.00)	0.00 (0.00)	44.97 (0.00)	73.17 (28.20)
2. Goods	8.10 (8.10)	0.00 (0.00)	0.00 (0.00)	39.60 (0.00)	47.70 (8.10)
3. Services	0.00 (0.00)	0.00 (0.00)	17.40 (17.40)	1.60 (0.00)	19.00 (17.40)
4. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
5. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
6. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Total	36.30 (36.30)	0.00 (0.00)	17.40 (17.40)	86.17 (0.00)	139.87 (53.70)

In addition, a PHRD grant financed about US \$ 0.5 million of consultancy services.

^{1/} Figures in parenthesis are the amounts to be financed by the IDA Credit. All costs include contingencies.

^{2/} Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.

Project Financing by Component (in US\$ million equivalent)

Component	Appraisal Estimate			Actual/Latest Estimate			Percentage of Appraisal		
	IDA	Govt.	CoF.	IDA	Govt.	CoF.	IDA	Govt.	CoF.
1. Kapichira	51.06	54.78	67.73	46.70	16.70	66.70	91.5	30.5	98.5
2. Generation Rehab.	0.45	0.18	4.97	3.93	0.25	1.10	873.3	138.9	22.1
3. Transmission		2.55	16.28					0.0	0.0
4. Distribution		5.95	23.11					522.2	0.0
5. Institutional	2.24	0.09	0.40	1.60	0.47	0.40	71.4	522.2	100.0
6. Studies				0.45					
7. Non-Power Component	1.25	0.09		0.85			68.0	0.0	

Annex 3: Economic Costs and Benefits

The SAR calculated the economic rate of return for the power system investment and technical assistance components combined. It also included the costs and benefits of Phase II of Kapichira in the calculation. All costs and benefits were expressed in 1990 prices. Incremental operating and maintenance costs were estimated at 2 % of the capital costs. Incremental benefits for the generation rehabilitation and transmission and distribution reinforcement components were estimated separately from those of the Kapichira hydroelectric plant. The benefits of the generation rehabilitation and the transmission and distribution components were valued at the avoided cost of diesel generation (K 0.9/kWh); the benefits of Kapichira at the planned 1998 tariff, deflated to a 1990 price equivalent (K 0.155/kWh). Benefits over Kapichira's second 25 years of its assumed 50 year economic life were discounted to 2019 at a rate of 10%. Based on the above assumptions, the SAR estimated the project's economic rate of return (ERR) at 16.1%. A large portion of the benefits were to be accrued from the rehabilitation of the generation, transmission and distribution systems. The SAR tested the sensitivity of the ERR to major project risks: underestimation of capital costs and overestimation of demand growth. A 20% slower growth in demand produced a rate of return of 12.1%.

The ex-post economic evaluation has broadly followed the methodology used in the SAR, though it has been modified to take into account the changed configuration of investments due to the cancellation of the rehabilitation of the transmission, distribution systems as well as the a portion of the generation rehabilitation and thus economic benefits. The ICR re-estimated the ERR at about 11% assuming an electricity demand growth of 5 % per year. If the annual demand grew only by 4%, the ERR would drop to about 10%. The difference between the ex-post ERR estimate and the SAR estimate can be explained by the reduction in benefits due to the cancellation of the rehabilitation components and by the lower than expected growth in electricity demand (Table 2 below). However, the resultant impact was moderated by the lower than expected capital cost of Kapichira. It can be noted that the ex-post ERR is close to the SAR estimate of the ERR for Kapichira alone.

The value for benefits used in the SAR most likely underestimates the economic benefits of additional supply since it did not include consumer surplus. If the ERR is re-calculated including an estimate of consumer surplus in the benefits stream, the project would produce a 12 % rate of return even if annual demand growth was less than 3% during the lifetime of the project.

Table 1. Ex-Post Estimation of Internal Economic Rate of Return

COSTS			BENEFITS				
Year	Capital	O&M	Gen. Rehab GWh	Kapichira GWh	Gen Rehab. \$ million	Kapichira \$ million	Net Benefits \$ million
1992	0						0
1993	0						0
1994	3	0.2					-3
1995	16	0.3					-17
1996	4	0.3					-5
1997	14	0.3					-14
1998	19	0.3					-19
1999	57	0.3	10	0	3.3	0	-54
2000	33	0.3	10	43	3.3	2	-27
2001	13	0.3	10	89	3.3	5	-5
2002	0	0.3	10	137	3.3	8	11
2003	0	0.3	10	187	3.3	11	14
2004	0	0.3	10	240	3.3	14	17
2005	20	0.4	10	296	3.3	17	0
2006	10	0.4	10	354	3.3	20	13
2007	10	0.4	10	415	3.3	24	17
2008	5	0.4	10	479	3.3	28	25
2009	0	0.4	10	547	3.3	31	34
2010	0	0.4	0	617	0	35	35
2011	0	0.4	0	658	0	38	37
2012-	0	0.4	0	658	0	38	37
2025	0	37.1	0	5,973	0	343	306

ERR: 11.2%

Table 2. Actual and projected electricity sales for fiscal years 1991/92 - 1999/00

Year ending March 31		1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00
Sales (GWh)	SAR	643	707	753	802	861	925	990	1059	
	Actual	661	667	704	732	728	743	802	847	869
Sales Growth	SAR	67%	100%	65%	65%	74%	74%	70%	70%	
	Actual	78%	09%	72%	40%	-0.5%	21%	79%	56%	26%

Annex 4. Bank Inputs

(a) Missions:

Stage of Project Cycle	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating		
	Month/Year	Count	Specialty	Implementation Progress	Development Objective
Identification/Preparation					
April/90	1	Environmental Specialist			
October/90	4	Power Engineer, Financial Analyst, Energy Economist, Forester			
March/91	3	Power Engineer, Financial Analyst, Energy Economist,			
Appraisal/Negotiation					
August-September/91	3	Power Engineer, Financial Analyst, Energy Economist,			
Supervision					
November/92	1	Power Engineer	S	S	
March-April/93	2	Power Engineer, Resettlement Specialist	S	S	
July/93	1	Power Engineer	S	S	
September/93	1	Power Engineer	S	S	
February/94	3	Power Engineer, Financial Analyst, Forester	S	S	
October/94	1	Power Engineer	S	S	
April-May/95	3	Power Engineer, Financial Analyst, Environmental Specialist	S	S	
September/95	1	Power Engineer	S	S	
February/96	3	Power Engineer, Financial Analyst, Environmental Specialist	S	U	
December/96	3	Power Engineer, Financial Analyst, Energy Economist,			
June and September/97	3	Power Engineer, Energy Economist, Environmental Specialist	U	U	
April/98	3	Power Engineer, Financial Analyst, Energy Economist,	S	U	
September/98	3	Power Engineer, Financial Analyst, Energy Economist,	S	U	
March/99	4	Power Engineer, Financial Analyst, Energy Economist, Financial Management Specialist	S	U	
October/99	2	Environmental Specialist, Resettlement Specialist	S	S	

December/99	5	Power Engineer, Financial Analyst, Energy Economist, Financial Management Specialist, Infrastructure Officer	S	S
May-July/2000	7	Power Engineer, Financial Analyst, Energy Economist, Financial Management Specialist, Infrastructure Officer, Environmental Specialist, Resettlement Specialist	S	U
ICR May- July/2000	7	Power Engineer, Financial Analyst, Energy Economist, Infrastructure Officer, Financial Management Specialist, Environmental Specialist, Resettlement Specialist	S	U

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US\$ (,000)
Identification/Preparation	121.5	292.2
Appraisal/Negotiation	27.8	79.3
Supervision	186.5	582.1
ICR	9.0	35.3
Total	284.8	988.6

Annex 5. Ratings for Achievement of Objectives/Outputs of Components

(H=High, SU=Substantial, M=Modest, N=Negligible, NA=Not Applicable)

	Rating				
☒ Macro policies	☐ H	☐ SU	☐ M	☐ N	☒ NA
☒ Sector Policies	☐ H	☐ SU	☒ M	☐ N	☐ NA
☒ Physical	☒ H	☐ SU	☐ M	☐ N	☐ NA
☒ Financial	☐ H	☐ SU	☐ M	☒ N	☐ NA
☒ Institutional Development	☐ H	☐ SU	☒ M	☐ N	☐ NA
☒ Environmental	☒ H	☐ SU	☐ M	☐ N	☐ NA
 <i>Social</i>					
☒ Poverty Reduction	☐ H	☐ SU	☐ M	☐ N	☒ NA
☒ Gender	☐ H	☐ SU	☐ M	☐ N	☒ NA
☒ Other (Please specify)	☐ H	☐ SU	☐ M	☐ N	☒ NA
☒ Private sector development	☐ H	☐ SU	☐ M	☐ N	☒ NA
☒ Public sector management	☐ H	☐ SU	☐ M	☒ N	☐ NA
☒ Other (Please specify)	☐ H	☐ SU	☐ M	☐ N	☒ NA

Annex 6. Ratings of Bank and Borrower Performance

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HU=Highly Unsatisfactory)

6.1 Bank performance

Rating

☒ Lending

☐ HS ☒ S ☐ U ☐ HU

☒ Supervision

☐ HS ☒ S ☐ U ☐ HU

☒ Overall

☐ HS ☒ S ☐ U ☐ HU

6.2 Borrower performance

Rating

☒ Preparation

☐ HS ☒ S ☐ U ☐ HU

☒ Government implementation performance

☐ HS ☐ S ☒ U ☐ HU

☒ Implementation agency performance

☐ HS ☐ S ☒ U ☐ HU

☒ Overall

☐ HS ☐ S ☒ U ☐ HU

Annex 7. List of Supporting Documents

1. Aide Memoires, Back-to-Office Reports, and Project Status Reports;
2. Project Progress Reports;
3. Consultant Study Reports financed under the Project;
4. Borrower's Evaluation Report dated December 15, 2000; and
5. Staff Appraisal Report for Malawi Power V project dated May 19, 1992 (Report No. 10055-MAI)

MAP SECTION

