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IMPLEMENTATION COMPLETION REPORT
(IDA-24890)

ON A

CREDIT

IN THE AMOUNT OF US\$200 MILLION EQUIVALENT

TO THE UNITED REPUBLIC OF

TANZANIA

FOR TANZANIA POWER VI PROJECT

June 30, 2003

Energy Team
Africa Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective June 12, 2003)

Currency Unit = Tanzanian Shilling

1041.50Tsh = US\$ 1.00

US\$ 1.00 = SDR 1.41

FISCAL YEAR

TANESCO: January 1 to December 31 Government: July 1 to June 30

ABBREVIATIONS AND ACRONYMS

AIC	=	Average Incremental Cost
DfID	=	Department for International Development
EA	=	Environmental Assessment
EIB	=	European Investment Bank
ESMAP	=	Joint UNDP/World Bank Energy Sector Management Assistance Program
JICA	=	Japan International Cooperation Agency
KfW	=	Kreditanstalt für Wiederaufbau
LRMC	=	Long Run Marginal Cost
MTNRE	=	Ministry of Tourism, Natural Resources and Environment
MWEM	=	Ministry of Water, Energy and Minerals
NORAD	=	Norwegian Agency for Development Cooperation
NUWA	=	National Urban Water Authority
ODA	=	Overseas Development Administration
PIP	=	Productivity Improvement Program
PPF	=	Project Preparation Facility
SADCC	=	Southern African Development Coordination Conference
STAMICO	=	State Mining Corporation
TAC	=	Tanzania Audit Corporation
TANESCO	=	Tanzania Electric Supply Company Ltd.
TIPER	=	Tanzanian and Italian Petroleum Refinery Company
TIRDO	=	Tanzania Industrial Research and Development Corporation
TPDC	=	Tanzania Petroleum Development Corporation
TTI	=	Technical Training Institute
ZSFPC	=	Zanzibar State Fuel and Power Corporation

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**TANZANIA
POWER VI**

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IBRD MAP #22162 - Tanzania Power VI Project

<i>Project ID:</i> P002756	<i>Project Name:</i> POWER VI
<i>Team Leader:</i> Alfred B. Gulstone	<i>TL Unit:</i> AFTEG
<i>ICR Type:</i> Core ICR	<i>Report Date:</i> June 30, 2003

1. Project Data

Name: POWER VI *L/C/TF Number:* IDA-24890
Country/Department: TANZANIA *Region:* Africa Regional Office
Sector/subsector: Power (91%); Oil & gas (7%); Central government administration (2%)
Theme: Other urban development (P)

KEY DATES

	<i>Original</i>	<i>Revised/Actual</i>
<i>PCD:</i> 03/30/1990	<i>Effective:</i> 12/27/1993	12/27/1993
<i>Appraisal:</i> 06/15/1992	<i>MTR:</i> 03/10/1999	03/10/1999
<i>Approval:</i> 05/06/1993	<i>Closing:</i> 06/30/2000	06/30/2001

Borrower/Implementing Agency: MINISTRY OF ENERGY/TANESCO
Other Partners: NORAD, SIDA, KfW, EIB, NDF, DfID

STAFF	Current	At Appraisal
<i>Vice President:</i>	Callisto E. Madavo	Edward V. K. Jaycox
<i>Country Director:</i>	Judy M. O'Connor	Francis Colaco
<i>Sector Director:</i>	Praful C. Patel	Stephen Weissman
<i>Team Leader at ICR:</i>	Alfred B. Gulstone	Asaf Malik
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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: U
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 project's objectives, as stated in the Staff Appraisal Report (SAR) were:

- (i) Meeting the growing demand for electricity at least cost through the construction of the Lower Kihansi hydroelectric scheme;
- (ii) Helping the Government restructure the power sector to promote efficiency and private investment;
- (iii) Continuing the work already started on improving energy efficiency by reducing system losses, improving service quality, and supporting demand-side management initiatives;
- (iv) Providing training and technology to improve skills and management effectiveness of staff in sector institutions; and
- (v) Promoting the development and operation of gas-fueled generation by private investors.

3.2 Revised Objective:

The original project's objectives for meeting power demand at least cost were focused on the Lower Kihansi Power Plant, which was expected on stream in 1998. However, due to severe drought in 1994, the Bank revised its objectives to support the emergency needs of the power system beginning in 1995, by financing Tanesco's Emergency Power Program (EPP). To finance this program, the Bank and the Borrower agreed to divert resources from distribution investments to more urgent generation investments. This reallocation essentially limited the project's energy efficiency objective to demand-side work – preparing audits of selected large-scale industries.

3.3 Original Components:

Table 3.1 shows the project's original components by project objective supported, category and implementing agency. There were three implementing agencies for the project: **Tanzania Electric Supply Company Ltd. (Tanesco)**, **Zanzibar State Fuel and Power Corporation (ZSFPC)**, and the **Ministry of Water, Energy and Minerals (MWEM)**. Tanesco was to implement components that accounted for 94 percent of the project's total baseline costs. These included the project's main investment components – the 180 MW Lower Kihansi Hydroelectric Plant, the rehabilitation of the Kidatu Hydroelectric Plant and distribution system investments – as well as technical assistance and studies for improved system planning, financial performance, and demand side management. ZSFPC was responsible for: managing a study to define feasible options for its future structure; installing a new accounting system; hiring a commercial manager to oversee its commercial operations until the restructuring of the company; and installing prepayment meters and associated materials to help improve collections. MWEM was mainly responsible for studies to advance restructuring and private sector development in the electricity and gas sectors.

For Implementation by TANESCO

- construction of the 180 MW Kihansi Hydroelectric Plant
- expansion, reinforcement and loss-reduction in the distribution system
- provision of vehicles, tools and meters to improve distribution and commercial operations
- completion of the rehabilitation of the Kidatu Hydroelectric Plant
- management support and training
- provision of computerized management information systems (MIS) and services to support TANESCO's decentralized operations
- studies including tariff, assets valuation, power system master plan, hydroelectric plant feasibility, and distribution standards
- demand side management activities including audits and advertising

- upgrading of the dispatch center equipment and communication systems
- provision of workshop equipment

For Implementation by ZSFPC

- a study of the operation of ZSFPC to define feasible options for its future structure
- provision of a commercial manager for ZSFPC to oversee commercial operations until the utility is restructured
- provision of prepayment meters and associated materials to help improve collections

For Implementation by MWEM

- a study of the structure of the power sector and its associated regulatory framework in Tanzania to define options for restructuring to improve efficiency, and to explore ways of introducing private sector financing and management;
- provision of consulting services to help promote private sector financing and operations of thermal generation using gas from Songo Songo;
- provision of equipment to help develop generation from using the Mnazi Bay gas field in a joint arrangement with the private sector;
- training and office technology for energy staff of the ministry.

Table 3.1

Summary of Project Components by Project Objectives

Project Objective	Components and Implementing Agency
	Investments in Equipment, Technical Assistance, Studies and Training
<i>Meeting Demand at Least Cost</i>	180 MW first stage of the Lower Kihansi Hydro Plant (T) Completion of the Kidatu Hydro plant's rehabilitation (T) Expert Project Manager (T) Panel of Experts to review technical matters, safety and construction problems (T) Power Sector Master Plan (T) Hydro Plant Feasibility(T)
<i>Helping the Government restructure the sector</i>	Office technology to support energy planning work of the Ministry of Energy, Water and Mines (M) Training of energy staff (M) Consulting services for promotion of private sector financing and operation of thermal generation using gas from Songo Songo (M) Power Sector Structure Study (M)
<i>Continuing power</i>	Equipment for expansion, reinforcement and loss reduction of distribution

<i>system efficiency improvement</i>	<p>systems of major load centers (T)</p> <p>Upgrading of dispatch and communications systems. (T)</p> <p>Provision of pre-payment meters and other equipment to improve collections (Z)</p> <p>Management support and training in distribution system operation and maintenance. (T)</p> <p>Demand side management study (T)</p> <p>Tariff Study (T)</p> <p>Asset Valuation Study (T)</p> <p>Institutional Structure and Development (Z)</p> <p>Materials Management System (T)</p>
<i>Providing Training and Technology</i>	<p>Computerized management information systems and services to support Tanesco's decentralized operations and training in all aspects of power system operation (T)</p> <p>Commercial Manager to oversee ZSFPC's operations (Z)</p>
<i>Promoting the development and operation of private gas generation</i>	<p>Equipment to develop pilot generation at Mnazi Bay gas field, jointly with the private sector (M)</p> <p>Consultant assistance for promotion of Songo Songo gas development by private investors (M)</p> <p>Consultant assistance for the promotion of Mnazi Bay gas development by private investors (M)</p>

Note: M = Ministry of Water, Energy and Mines
T = Tanesco
Z = Zanzibar State Fuel and Power Corporation

3.4 Revised Components:

The Bank and the Borrower reallocated project funds in line with the revised objective of supporting Tanesco's EPP (see para 3.2 revised objectives). In support of this program the Bank financed 70 MW of gas turbine capacity, that was critical to deal with the capacity constraints; the cost of this added capacity was US\$ 44 million. In order to fund this additional capacity, the Bank had to reduce project components for distribution strengthening, system loss reduction, and uncommitted funds for the Mnazi Bay gas-fired power plant components. Table 3.2 shows the reallocated amounts by component. The largest reduction was in the component for distribution strengthening and rehabilitation, which declined from US\$ 18.5 million to US\$ 1.7 million. Essentially the restructuring of the project's components shifted the project's priority towards ensuring adequate generation capability under unexpected emergency conditions that threatened major load shedding with a potentially disastrous impact on the emerging market economy.

Table 3.2
Impact of the Credit Reallocation due to EPP Funding

Project Component	Estimated Cost at	Amount Reallocated	Remaining
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	Appraisal (US\$ million)	to Support the EPP (US\$ million)	Amount of the Original Credit Components Affected (US\$ million)
Mnazi Bay Gas Component	16.7	13.5	3.2
Distribution Strengthening and Rehabilitation	20.2	18.5	1.7
Loss Reduction	20.9	12.0	8.9
Total	57.8	44.0	13.8

At the time of project restructuring, the Bank reviewed the progress the Borrower was making in project implementation and in meeting the project's development objectives. The preparatory work for the Lower Kihansi Hydro Plant had begun. The bids for the main civil works contract were under evaluation. Other work at the site, including the gathering of baseline environmental data, was on schedule. The Bank also found that the Borrower and Tanesco were making acceptable progress toward institutional development and financial performance, as noted in Table 3.3.

Table 3.3
Review of Project Progress During Its Restructuring (1995)

<p><i>Institutional Development</i></p> <ul style="list-style-type: none"> · Adoption of a decentralized organizational plan for the seven distribution zones and a system of accountability. · Installation of management information systems in progress. · Introduction of a modernized billing system to help reduce commercial losses through inadequate billing of electricity consumed. · Planned installation of the new billing and accounting systems in January 1996 and reported progress of Tanesco in clearing the accounting backlog.
<p><i>Financial Performance</i></p> <ul style="list-style-type: none"> · An increase in Tanesco's tariffs to an average of US\$.09 per kWh, the estimated long-run marginal cost of power. · Completion of a tariff study that concluded that Tanesco's financial position was weak but improving. It also confirmed that the average tariff of US\$.09 per kWh was adequate but recommended annual increases in line with the level of international inflation.
<p><i>Restructuring and Privatization</i></p> <ul style="list-style-type: none"> · Acceptable progress in arranging the proposed, private sector financed, Songo Songo Gas Development and Power Generation Project and the Mnazi Bay gas-fired power generation component of Power VI.

Compliance with Key Covenants

- In general, the Borrower and Tanesco had complied with their obligations under the project except for delays in submitting Tanesco's annual audit report. However, Tanesco's ability to close its books on time depended on the completion of the accounting system which was not scheduled for completion until 1996.

3.5 Quality at Entry:

There was no quality rating at appraisal. The ICR has rated the quality of entry as satisfactory, given sector priorities and the rigorous preparation work for the project's main components.

Consistency of Concept, Objectives and Design with Government Priorities and the Bank's Assistance Strategy

Country Assistance Strategy and Government Priorities. The Bank's Country Assistance Strategy for Tanzania included support for the development of power supply at least cost, along with capable energy planning and sound financial management. A key factor in meeting these objectives was the initiation of structural reform that would increase efficiency through competition brought by private sector participation. In line with this strategy, the Government's priorities were the least-cost development of the country's hydro and gas resources to both improve security of supply and minimize the impact of imported fuel price fluctuations.

Key Concepts. Two key concepts served as the basis for the project's objectives. The first was that increased generating capability and improved reliability were priorities for economic development and the general well being of the country. The second was that fundamental reforms were necessary to increase Tanesco's autonomy in order to achieve greater efficiency and productivity (SAR, Tanzania: Power VI Project, para. 4.13). The Bank and the Borrower prepared the project during a period of transition in Tanzania to a market-oriented economy after a long period of central planning. It was also the beginning of a transition for the Bank. During the final stages of the project's preparation for the Board, the Bank established a set of guidelines for power sector lending that required evidence of borrower commitment to sector reform to achieve greater efficiency. This reform required a commitment to involve the private sector in the process.

Relevance of Objectives. The least-cost expansion of the power system was a priority objective for both the Bank and the Government as well as an important element in the Bank's assistance strategy. Assistance to the Government in sector restructuring supported the Government's objective of ensuring reliability and security of supply as well as the Bank's strategy of supporting structural reform, resource development, and end-use efficiency. The provision of training and technology links directly to the Government's objective of human resource development and the Bank's strategy for capable energy planning and sound management. Finally the promotion of gas-fueled generation through private investment was in line with the Government's objective to develop hydro and gas resources at least cost and the Bank strategy for efficient resource development.

Expansion and rehabilitation of the system was critical because of electricity supply constraints resulting from hydrological factors and the poor condition of a number of plants. At the time of project appraisal, the total installed capacity of the system was 474 MW of which hydropower accounted for 326 MW or 69% of

the total. Two major hydroelectric stations, located southwest of Dar es Salaam, were supplying the bulk of power to the system: the Kidatu station, with an installed capacity of 204 MW, and the Mtera station, with a total installed capacity of 80 MW.

The output of the Kidatu station had declined to only 153 MW in 1989 due to the failure of one unit and had experienced a further decline to 95 MW because of low reservoir levels resulting from drought. SIDA financed the repair of the unit that had failed. The project included additional work to improve the reliability of the Kidatu station. The smaller stations in the Pangani River basin had a total capacity of 42 MW. Thermal generation capacity included 10 diesel powered generating stations, in varying stages of availability, that provided an alternative source of energy during low river flow periods and equipment failures. A second-hand gas turbine station of 13.5 MW, installed at Ubungo, had been out of commission for several years. In addition to the interconnected system, Tanesco was operating about 20 small diesel generating systems supplying areas too remote to receive power from the interconnected grid.

Tanesco's interconnected system had been practicing severe peak load shedding due to drought. Lower than average water inflows in 1991 and 1992 caused the water levels in the two main hydro basins to decline significantly. This resulted in a major reduction of available capacity. Peak load shedding at times had been as high as 100 MW or more though Tanesco tried to reduce the shortfall as much as possible. Due to the lack of financing for the rehabilitation of all of its diesel units, the system's capacity was severely constrained. Furthermore, to avoid more extensive load shedding, Tanesco had been operating the hydro plant at very high plant factors. This operating regime led to the low reservoir levels. The base case demand forecast indicated the need for substantial new generation capacity during the 1990s and the Lower Kihansi scheme was to meet this need. Rehabilitated diesel units and the redevelopment of the Pangani Falls station were to provide additional capacity. But even under the low forecast of demand growth, the need for some new short-term generating capacity was likely.

On the technical side of its operations, Tanesco needed to address two main problems: the deterioration of the distribution network, partly due to overloading and to substandard work; and the low availability of the diesel stations due to inadequate maintenance. Tanesco staff were receiving training on maintaining the diesel plants that Tanesco used. However, long term training at the technician level was needed and was to take place the Technical Training Institute at Kidatu. The project was to finance: a specialist, for three years, to manage this program; and the foreign exchange costs of modern equipment needed for workshops, laboratories and classrooms for the Institute.

Management and Commercial Operations. The project was to make a substantial contribution to increasing the capability of Tanesco staff through studies, technical assistance, new technology and improved staffing. The Government had adopted a Parastatal Reform Program to improve the operational efficiency of parastatal enterprises, reduce the burden of loss-making enterprises on the Government; expand the role of the private sector in the economy and prepare key enterprises for privatization. In line with these objectives, the project provided several institutional strengthening measures to improve Tanesco's operational efficiency and financial performance. The SAR noted that Tanesco planned to focus its institutional development efforts on four key areas: corporate planning; management; manpower development; and the Productivity Improvement Program (PIP).

Part of the project's design was to have the company prepare an annual corporate plan as the principal instrument for the ongoing review of Tanesco's operations and institutional development. The plan was to include a detailed annual budget with a discussion of assumptions and strategies for improving performance in key areas such as collections, disconnections, write-offs, administrative costs, staffing and performance evaluations; and manpower training. The plan also was to include information on and

rationale for any changes in the agreed investment program. The project included a Planning Manager for three years, to establish a Planning Division for preparing and implementing the corporate plan.

Staffing and manpower development were major problems at the time of project appraisal. Although as a whole the company was overstaffed, it still did not have sufficiently skilled staff. Low salaries were a contributing factor. For example, the SAR noted that the average salary level dropped from about US\$220 equivalent per month in 1970 to around US\$50 per month at the time of project appraisal. At that level, many people could not afford to support their families and were forced to take a second or even a third job (SAR, para. 2.8, p.15). The determination of the size and distribution of staff was an ongoing process which was to depend on the requirements of the utility's annual corporate plans. The project's design required the hiring of an external manpower development expert for six months and Tanesco agreed to implement staffing recommendations early in the project (1994).

To address skill deficiencies in the company, the project included an extensive training component. In the areas of finance and accounting, Tanesco was to expand the curriculum of its training program with more emphasis on corporate finance, management information systems and new accounting procedures. Tanesco also required management systems and procedures to accurately delineate responsibilities for committing the organization's resources. To promote modern management tools, the project's design called for the hiring of a Systems Manager early in the implementation of the project and the establishment of a management information system.

Under the Power System Rehabilitation Project (CR. 1687-TA), IDA and Tanesco had agreed on the need for a comprehensive program for modernizing Tanesco's data processing system. IDA financed the services of a senior financial advisor and a systems analyst to implement the program. However, Tanesco's difficulties in attracting and retaining competent advisors delayed the implementation of a fully functional MIS. The existing system deteriorated to the point where it became necessary to hire a group of experts to prevent its collapse in the short term and, in the long term, to assist the company in acquiring modern computerized billing and accounting systems. The Power VI project was to finance these new systems.

Tanesco established a productivity improvement program to reward employees for achieving performance targets. The company designed an MIS to monitor performance vs. targets. It began about a year before project appraisal. The program's original target was the reduction of the workforce from 6500 to 4500 over a three year period, about 10 percent a year. In the first six months, the reduction of 500 employees exceeded that rate. It took place through a severance package and was consistent with the goal of a smaller workforce with higher productivity and better pay. In these first six months, there were significant increases in productivity as well as reductions in both accounts receivable and operating costs. At the same time, employee compensation nearly doubled. However, this initial success did not last and management commitment to achieving the productivity targets weakened. To ensure the continued implementation of this program the project included the financing of the services of an internationally recruited expert for a period of three years. Also, as indicated in Table 3.4, prior to the project, the Government developed a general policy framework for the privatization of parastatal companies and Tanesco began some reorganization in anticipation of eventual privatization. The actions to be taken during the project focused on studies, technical assistance and investments to build on these initial actions, strengthening Tanesco as a commercial entity and establishing the framework for sector restructuring and privatization.

Table 3.4
Summary of Actions Toward Restructuring Taken Prior to Appraisal and
Planned during the Project's Implementation

GOVERNMENT OF TANZANIA

Actions Taken Prior to Project Appraisal

Policy Framework. Statement on Parastatal Reform as part of a development strategy focused on creating an efficient, well functioning and rapidly growing economy and a set of reform objectives
Institutional Framework. Establishment of a Parastatal Sector Reform Commission

Actions to be Taken During the Project

Power Sector Restructuring. Completion of a study on restructuring options and implementation of the study's recommendations

Privatization Promotion. Testing of the gas well at Mnazi Bay to provide information for potential investors and financing of preparatory work for the Songo Songo private gas development project

Measures to Support the Commercial Operation of Tanesco. In the project's legal agreements the Government agreed to several key measures for the viable operation of the power system prior to sector restructuring:

- Reduction of Government arrears in payment to Tanesco to a specified acceptable level
- Authorization for Tanesco to disconnect large governmental customers for non payment.
- Agreement to compensate Tanesco for any required service connection for rural areas which may be desirable from a social perspective but not financially viable.
- Compensation to Tanesco for electricity used, but not paid by ZSFPC.

TANESCO

Actions Taken Prior to Project Appraisal

Internal Reorganization to Facilitate Divestiture. Decentralization of distribution operations and upgrading of management in seven distribution zones.

Measures for Improved Operational Performance. Establishment of an effective Productivity Improvement Program to improve motivation and efficiency of operations.

Actions to be Taken During the Project

Divestiture of Non-Core Business. Sale of the company's distribution construction business to private investors.

Institutional Strengthening for Improved Commercial Operation. The project included a multifaceted program of investment, studies, technical assistance and training components to ensure Tanesco's commercial operation prior to privatization. This program included:

- Distribution investments to improve reliability and reduce commercial losses
- Equipment to complete the upgrading and decentralization of the company's billing and accounting systems
- Rationalization of Tanesco's staffing by filling key vacant positions, providing short term expertise for the implementation of key programs, but at the same time improving productivity and reducing overall staff

- Studies on revaluation of assets, staffing and compensation.
- Extensive training at all levels of the company

Quality of Project Design.

Strategic Choices. The Bank and the Borrower had two main strategic choices in the design of the project. The first was a technical choice --the selection of a hydro project over a gas generation project. The second was an institutional choice -- the strengthening of Tanesco prior to restructuring, either by: (a) building up the capability of the utility through an integrated program of upgraded management technology, expert assistance and training or (b) contracting the management of the utility to a foreign firm with a proven track record of efficient technical and financial performance in power company management.

The SAR noted that both the Lower Kihansi Hydro plant and a plant operating on natural gas from the Songo Songo gas field would have a similar economic rate of return. As a result, focus then centered on the sequencing of these two investment options. The advantage of gas fired generation was the possibility of adding units in small increments to meet demand. Also, the gas turbines could have backed up the hydro system which was frequently capacity constrained. Furthermore, domestic gas development for power also offered the possibility of saving petroleum products and foreign exchange not only in generation but in substitution for fuel oil and diesel oil used in industry. However, considerable uncertainty surrounded the gas option because Tanzania did not have the experience or the resources for gas development and would have required foreign participation. Also, at the time, the investment climate in Tanzania was not attractive enough to bring in the foreign capital required to develop gas resources.

In contrast to the gas option, Tanesco had considerable experience implementing hydropower projects. With hindsight, the choice of the Kihansi hydro plant allowed Tanesco to develop much needed capacity sooner. The Bank began preparing the Songo Songo power project around the same time Power VI went to the Board. However, because of complex institutional arrangements related to the private sector participation, the Songo Songo Project received Board approval around the time the Lower Kihansi plant came on stream.

On the institutional side, at the time, there were not many examples of successful management contracts with developing country power companies. The Government had already taken a number of steps toward sector restructuring and the reorganization of Tanesco, demonstrating a commitment to reform, e.g. the legal framework in Tanzania allowed for private generation, as shown in Table 3.4. Thus at the time of appraisal it made sense to go with the strengthening of the utility to prepare it for privatization.

Technical Aspects. The design of the project's main physical components -- the 180 MW Lower Kihansi Plant and distribution infrastructure -- had a considerable amount of preparation. The Japan International Cooperation Agency (JICA) financed a detailed feasibility study of the Lower Kihansi hydro site and prepared a report dated September 1990. Also in 1990, ESMAP helped Tanesco prepare the distribution component of the project. During the preappraisal of the project in January/February 1991, the Government and Tanesco requested IDA to finance, through a technical assistance credit, the detailed design and preparation of bid documents for the Lower Kihansi Hydroelectric scheme.

One of the conditions for presenting the project to the Board was satisfactory completion by Tanesco's consultants of a draft inception report on the detailed design and latest cost estimates of the scheme, to ensure its economic viability. The draft inception report reconfirmed the overall attractiveness of the Lower Kihansi site in terms of preceding the competing Songo Songo gas development project. As an additional security measure, Tanesco employed a Panel of Experts to conduct an independent review of the Lower Kihansi hydro project's design.

At the time of project appraisal, the Bank had recently completed the Power Engineering and Technical Assistance Credit, which the Board had approved in 1992. The main purpose of this project was the preparation of Power VI. In addition to the design work for Power VI, this project was financing consultants to assist Tanesco in implementing a new billing system as well as identifying unauthorized connections. Furthermore, the ESMAP Loss Reduction and Distribution Expansion Study had identified measures to reduce both technical and non-technical losses. The efforts of the task force Tanesco had created to implement ESMAP recommendations already had helped to increase sales revenues.

Institutional Aspects. The SAR noted that two major objectives of the project were the improvement of Tanesco's performance and the company's partial privatization. It also emphasized the importance of the institutional component. In this regard the project's design included numerous covenants focused on: (a) strengthening the management and operations of Tanesco by hiring the following staff: Planning Manager; Systems Manager; Management Training and Personnel Expert; Director and Head Instructor of the Morogoro Training Institute; Training Expert for the Kidatu Technical Training Institute; Training Expert in Distribution Planning; and Productivity Improvement Expert; (b) establishing financial performance indicators during the project's implementation -- the two key financial indicators were receivables no more than 75 days of sales and a cash contribution to investment rising from 15 percent in the first year to 30 percent for most of the project's implementation; and (c) ensuring that the Government would allow a strengthened Tanesco to operate as a commercially viable company -- the most important of these indicators was the Government's agreement to: compensate Tanesco for the bills of non-paying consumers who cannot be disconnected for humanitarian or other reasons; pay for any shortfall in the payments of ZSFPC to Tanesco; and reimburse Tanesco for the costs of rural electrification that may be socially important but financial not viable.

Environmental Impact Assessment (EIA). The Bank rated the project as Category A, requiring a full environmental impact assessment (EIA). Tanesco contracted with consultants to prepare the assessment, which was based on studies carried out during the period 1989-92. The studies found the Lower Kihansi hydro site preferable to other potential sites because of the smaller size of the reservoir, meaning that the project would disturb less land area. As a result of the small size of the reservoir inundation, the usual impacts of dam projects, such as population resettlement, were expected to be minor. There was virtually no population resettlement—only compensation was for two huts removed that were used by villagers when fishing. The other impacts identified were: (a) land loss of 30 ha for the reservoir; (b) 15-50 ha for the access road and camp; and (c) a wildlife habitat reduction of 15-20 ha. The affected land area was isolated and there was no downstream agriculture.

The Bank, in its review of the EIA, recommended two activities to bring it more in line with Bank guidelines: a terrestrial survey to gather more information on flora and fauna and consultation with local communities both of which were done. At the time of approval, the Board noted that the environmental assessment did not have a mitigation plan. Project staff indicated that such a plan would be prepared early in the project before major investments took place. The project included a covenant which required the preparation of a mitigation plan by end of June 1994.

Early in the project's implementation and before the finalization of an environmental mitigation plan, two non-governmental environmental organizations expressed concern that the Bank's original environmental assessment had not fully taken into account of the ecological impact of the project. Both organizations made specific comments about the apparent lack of attention given to the biodiversity of the area. A German environmental organization stated the following:

"...the project will have dramatic effects on the ecosystem of the Kihansi Gorge. Inside the gorge there is an intact forest vegetation which probably relies on the water provided by the Kihansi Falls for its

existence. The mist produced by the Kihansi Falls and the micro climate so created will be lost as a result of the project. This will also mean the irretrievable loss of the habitat of wild animals and plants that depend on these conditions for survival. Experts suspect there is a concentration of highly adapted endemic species in the Kihansi gorge which might be found only here. In order to establish the actual degree of endemism, it would be necessary to study comparable areas in the vicinity. So far, however, not even an inventory of species has been set up for the gorge itself.” Memorandum from Urgewald, June 1995.

A Norwegian organization expressed similar concerns about the potential loss of biodiversity. However, it is not clear from the files when and how these organizations obtained the data on the ecosystem while the project’s terrestrial survey of the project’s EIA did not report similar findings. However, it is important to note that the Kihansi Spray Toad, considered a “marker” for the ecology of the spray system ecology, reportedly is about the size of an adult thumbnail and according to research reports, has a tendency to hide in the rocks; it is therefore conceivable that a field team might miss the Spray Toad, depending on the season and the amount of time spent in the field. The full environmental assessment for the project did in fact make a reference to an endemic species of toad in Tanzania in general but stated that it was not known if it existed in the project area. The EIA states that “...Less is known about the amphibians and reptiles in the project area. They have not been studied in detail and it was not possible to make a comprehensive survey during the EA. Endemic species are known to exist in the Uzungwas Forests, such as a frog (Phlyctimantis keithae), an unnamed tree-frog (Hyperolius sp.) and a new species of toad (Nectrophryoides, sp.). Whether these species occur in the Kihansi area is unknown.”

At the time of project appraisal, Bank environmental guidelines allowed flexibility in the breadth and depth of the assessment based on the expected impacts. In the case of the Power VI project, the expected impact was low, given: the remoteness and inaccessibility of the location; the negligible impact on human activities; and a loss of wildlife habitat that was considered acceptable. In response to the comments of non-governmental environmental organizations, Bank environmental staff acknowledged that the loss of some wildlife habitat may be a cost of the project, which the original EIA had noted; it should be noted, however, that at this time the presence of unique, endangered species was not apparent in the project area. Nevertheless, the project took the concerns of the non-governmental agencies into account through the environmental monitoring component and carried out a number of related field studies.

The field discovery of an endangered ecosystem at Kihansi resulted from the diligent work of Tanesco’s environmental consultants during the project’s construction phase. The confirmation of this discovery, by an independent group in 1998, led to a modified mitigation plan, with donor funding, for saving the ecosystem.

Involvement of Stakeholders in the Project Design. The key stakeholders involved in the preparation of the project were: Tanesco, ZSFPC, and the Ministry of Energy. The project also consulted with possible co-financiers and with villagers near the project area.

Accuracy in Evaluating the Project’s Key Risks. The project identified three key risks to the project’s implementation. First, given the large number of donors projected, the Bank noted the risk that, because of shifting donor priorities, there might not be enough funds for the project’s major component – the Lower Kihansi Hydro plant. Recognizing this possibility, the Bank was prepared to reallocate funds from the distribution or institutional strengthening components. As a safeguard, the Bank made the finalization of satisfactory co-financing a condition of effectiveness.

The second major risk evaluated was that the difficult terrain of the project site might have led to commissioning delays, despite sufficient investigations of consultants. As a result, the Bank determined that

if problems turned out to be serious enough to affect the critical path of the project and a delay became inevitable, Tanesco would be able to respond by increasing the capacity of short-delivery gas turbines it planned to install before the commissioning of Kihansi (SAR: Tanzania, Power VI Project, para.4.65, page 53), thus mitigating against large shortfalls in supply. Third, the Bank mitigated against risks that could result from any restructuring done under the project, noting that careful planning of the transition with the use of competent consultants would reduce such a risk. Since the project did not in fact involve the actual restructuring of the sector, this risk was not an issue.

The SAR did not discuss, under the risk section, the fact that Tanesco's transformation to a viable commercial entity depended heavily on government compliance with covenants that would be pivotal to Tanesco's financial performance. This was an important consideration because, in the past, parastatal companies accounted for about 30 percent of Tanesco's accounts receivable. As it turned out, during project implementation, the arrears of parastatal companies remained an issue continuously with Government making only intermittent payments when pressed by the Bank and, at one point, only under the threat of disbursement suspension.

Capacity of the Implementing Agencies. Tanesco, the main implementing agency, was responsible for implementing a complex project with many components. However, at the time of appraisal, Tanesco already had a history of working with the Bank and had developed an expertise in implementing power projects. On the financial side, the company had difficulties due to low tariffs and inadequate billing and collections performance. In large measure, the company's financial problems were linked to the Government's drain on the company's finances through high levels of arrears from government clients, though weak financial management capacity and the absence of a commercial culture within Tanesco were other factors. The technology, technical assistance and training that the project provided were sufficient to support Tanesco's implementation capacity if the Government had adhered to project covenants. The components for the other two implementing agencies were fairly straightforward and within their capability to monitor.

Integration of Lessons Learned from Past Projects. The project's SAR made a concerted effort to integrate the lessons learned from past projects in the design of Power VI. It included a separate box outlining lessons learned and actions taken to incorporate them into the design of the project (SAR Ibid., Box 1.1, page 6). These lessons covered technical design, cost estimation, financing arrangements, bidding and contracting, financial objectives, training and environmental considerations. The project incorporated all of the lessons to some degree but two lessons in particular had an important bearing on the project. The first was to maintain close coordination with donors involved with the project to minimize the possible disruption due to lack of funds. In line with this objective, the Bank and donors met semi-annually and produced joint progress reports on the project. The second lesson was the importance of monitoring the ecological aspects of the project. In keeping with this lesson, the environmental monitoring component financed by NORAD found an endangered ecosystem that depended on the spray from the Lower Kihansi Falls. This discovery led to the initiation of mitigation activities in March 2000 that were designed to reduce risks to the Kihansi gorge ecosystem.

4. Achievement of Objective and Outputs

4.1 Outcome/achievement of objective:

Despite the highly satisfactory physical implementation of the project, which resulted in a major hydroelectric scheme being commissioned within budget and only 6 months behind the original schedule, the ICR has rated the project overall as Unsatisfactory. The main consideration for this rating was the lack

of significant progress made, by the time the project closed in June 2001, in improving the operational efficiency of the power sector and the operational performance of the principal sector institution, Tanesco, a key development objective of the original project. Indeed, by early 2001, the cost of electricity was one of the highest in the Africa region, there was an overwhelming business dissatisfaction with the cost, reliability and quality of electricity, and Tanesco itself over-staffed, poorly managed, and financially very weak.

The lack of tangible progress made in improving the efficiency of the power sector and the management of Tanesco as well as the slow progress made towards privatization, should not detract from a number of positive initiatives taken during the implementation of the project. First, the response of the Bank to the emergency drought situation in 1994 showed flexibility and helped avert major load shedding. Second, the commitment made by the government in late 2000 to recruit a new management team for Tanesco-and which came on board in February 2002-is now improving the managerial performance of Tanesco in the transition period to privatization. Finally, the response of the Bank in August 2000 to growing concerns in regard to the conservation of the ecosystem of the Kihansi gorge will help ensure that a critically needed investment in hydropower is also environmentally sustainable.

The discussion that follows focuses on the achievement of the different project objectives described in the original SAR of May 1993 i.e. tariff policy, physical, institutional, financial, and privatization objectives. A discussion of the overall environmental impact of the project investment is also included.

Tariff Policy Objectives

Tanzania's energy policy, as published by the Government in 1992, states that Tanesco should act as a commercial enterprise but at the same time meet a number of social objectives. However, Tanesco's statement of policy is more commercially-oriented than that of the Government. It provides that tariffs be set to allow Tanesco to earn a 10 percent rate of return on fixed assets in operation. The Government policy did not clarify the definition of the social objectives, their cost, or who will pay for them. The project therefore included a tariff study to help clarify this policy and a covenant that the Government would reimburse Tanesco for any electrification project that might be socially desirable but not financially viable.

Tanesco's consultants completed the tariff study in November 1993 (London Economics Ltd, Kennedy and Donkin, Ltd. And LE Energy, Electricity Tariff Study, Final Report, Volume I, Executive Summary). An update took place in 1996. The structure recommended by the study took into account the findings of the assets valuation study financed under the project, along with LRMC tariffs, Tanesco's financial requirements, and the government's social objectives, specifically the maintenance of a lifeline policy for the residential sector, and a rural development policy. The study recommended a simplified tariff structure, reducing the number of tariff categories from nine to seven. The recommended structure consists of a single residential category with a three part rising block tariff, light industrial and light commercial categories, a category for low-voltage supply with a maximum demand charge, single categories for medium-voltage and high-voltage supply, and a separate category for public lighting.

The Government increased the average tariff to US\$0.09 per kWh during the project's implementation period, in line with the project covenants. However, Tanesco could not fully implement the cost-based tariff structure that the study recommended since it was unable to secure government approval. Large industrial consumers continue to pay high rates to cross-subsidize small, residential consumers. The financial performance study in 2000 noted that industrial customers complained about tariff levels and indicated that, in the absence of measures to address cross-subsidization, Tanesco risks losing industrial

consumers to self-generation. Also, the study noted that unless the Government and Tanesco were to address end-user tariff issues, privatization would be difficult, since the end-user tariff structure should fully recover costs. Overall, the Government's achievement of tariff policy objectives was modest.

Physical Objectives

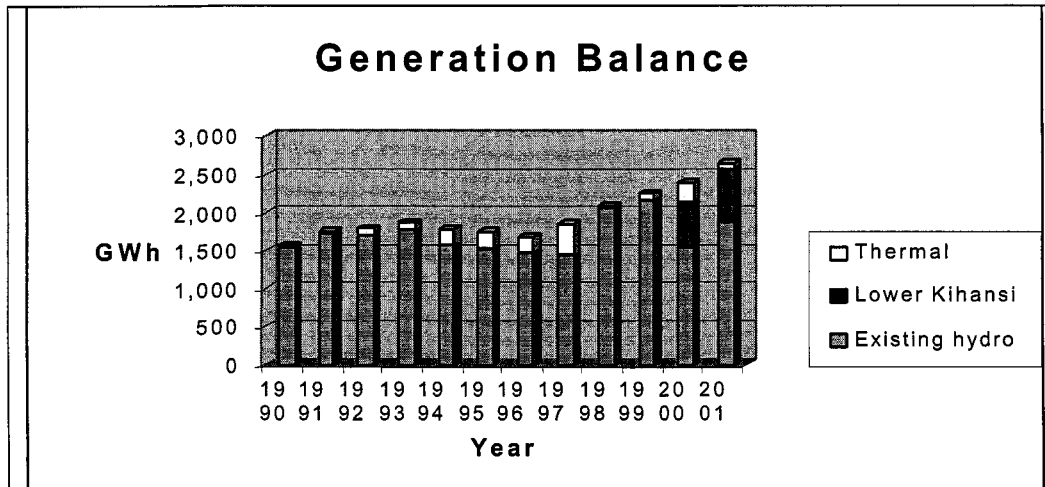
The main physical objective was to meet growing power demand, at least cost, through the construction of the 180 MW Kihansi Hydroelectric Plant. The Bank financed this plant jointly with NORAD, SIDA, the European Investment Bank (EIB), and KfW. Its original completion date, at the time of the SAR was 58 months after letting the preliminary works contract. The first unit was commissioned only six months late despite encountering serious geological problems. The commissioning of the plant's three 60-MW units took place as follows: the first in December 1999; the second in March 2000; and the third in May 2000.

Supervision reports indicate that beginning in 2000 the electricity output of this plant was substantial -- about 26 percent of the energy generated by Tanesco's interconnected system (Aide Memoire, Joint Donor Supervision Mission, October 2000). However, at the end of 2000, Tanesco again was faced with severe generation shortage that required extensive load shedding. The generation shortage resulted from Tanesco not having the funds to purchase enough fuel to operate the hydro-thermal system optimally and thereby have enough water in the reservoir for meeting power demand in the dry season.

In addition to the construction and operation of the Kihansi Hydroplant, the project increased the generating capacity of the system through the EPP. The project also rehabilitated the Kidatu Hydroelectric Plant, with financing from SIDA, and NORAD. The original completion date for this component was February 1997. However, due to the constraints on system capacity, Tanesco had to rehabilitate one unit at a time, and Tanesco completed the rehabilitation by 2001.

The EPP installed 70 MW of gas turbine capacity which came on stream only six months after the contract was signed, in 1995. Without this plant, Tanesco, may have been forced to cut power to almost half of its system, depending on hydrological conditions. Figure 1 shows Tanesco's generation for 1990-2001. Without thermal power, most of which came from new plants financed by the project under the EPP, Tanesco's generation would have declined steadily from 1995 to 1997, reaching a level lower than in 1990, causing major load shedding. In 1998 and 1999, hydrology improved and there was only a small amount of thermal generation. Between 1998 and 2001 sales rose steadily compared to relative stagnation during 1990-97. And with the Lower Kihansi plant fully on stream in 2000, Tanesco was able to meet rising demand with hydropower and reduce the amount of thermal plant use. In the years 1997 and 2000, there was considerable load shedding because Tanesco, due to government non payment, did not have the funds to purchase the fuel required for increased generation from the EPP units. Since 2000, the Lower Kihansi Plant has been supplying about one quarter of electricity consumption.

Figure 1: Impact of the EPP and the Lower Kihansi Plant to Meeting Power Demand



Source: Tanesco and Bank staff estimates.

Due to the high priority the project assigned to helping Tanesco cope with an emergency situation and the value to the economy of preventing widespread load shedding, the ICR has rated the overall achievement of physical objectives as “high.”

Institutional Development Objectives

The project’s institutional objectives were focused mainly on Tanesco, which was responsible for the implementation of the project’s physical components, that accounted for 94 percent of the project’s total base costs. The objectives for Tanesco were twofold: (a) prepare the company for privatization through divestiture of non-core businesses and a restructuring and privatization study; and (b) provide technology and training to improve the management effectiveness.

The SAR noted that the implementation of Tanesco’s institutional components was extremely important (SAR: Tanzania Power VI Project, para. 4.68, p. 54). Despite the utility’s many difficulties, Tanesco did make some progress towards attaining three of the four indicators of institutional improvement noted in the aforementioned paragraph of the SAR. First, the company increased and maintained the average tariff level throughout most of the project’s implementation. Second, it divested itself of a non-core business. Third, it hired a manpower development expert and put a freeze on new hiring pending the results of the staffing assessment. The reason for rationalizing the staffing of the institution was the finding at appraisal that Tanesco’s customer/employee ratio – a key indicator of management effectiveness – was way out of line with that of similar utilities in the region. At the time of appraisal it was 26 customers per employee. During project implementation it increased to 59 customers per employee in 1998, exceeding the target rate of 41 customers per employee.

At the same time, Tanesco's high level of accounts receivable remained an unresolved problem throughout the project and the commitment to reduce overall staffing to commercially acceptable standards was not fulfilled. By project completion, Tanesco remained, in essence, an overstaffed and poorly managed utility that despite a strong technical capacity was lacking a basic commercial culture.

Impact of Institutional Components on Tanesco. The project had several components designed to meet the general objective of improving Tanesco's operating and management effectiveness. These components included: the introduction of prepayment metering; the upgrading of the conventional billing and accounting systems; an improved materials management system; training in optimizing the hydro/thermal balance of the system and several technical studies.

The *prepayment metering system* was new for Tanzania and its introduction was originally to take place on a pilot basis. However, because of its success—despite some configuration complications—Tanesco and the Bank decided to expand coverage. Tanesco's interconnected system has about 400,000 customers. To improve collection performance the strategy of Tanesco and the Bank was to assign about 10 percent of the customers—mainly large consumers—to prepayment metering and upgrade the conventional billing system. The plan is to eventually place most of the system on prepayment metering.

Since a pilot testing of about 2,000 prepayment meters, Tanesco has installed around 42,000 meters with IDA financing; a few thousand with its own financing; and about 2,000 using KfW financing, which it will install in government agencies which have been delinquent in payment. Initially the system was not able to incorporate the step tariff structure accurately in the dispensing of electricity units and some customers were overcharged. The pre-payment meters installed by the manufacturer were designed for a flat tariff with a system where the computation was done centrally. However, in late 1996, Tanesco introduced a complex averaging system to correct the problem and ensure customers are charged fairly. Tanesco also has taken actions against tampering and collusion and a recent software upgrade apparently rectified problems with “double dispensing” of electricity.

The improvements to the *conventional billing system* concerned the replacement of an obsolete, centralized Wang system with a decentralized system covering Tanesco's 23 branches. The advantages of the decentralized new system over the Wang system are: closer proximity to the customer; the reduction of the lag time between meter reading and billing; and the capability of monitoring a customer's consumption. Tanesco has made strenuous efforts to rectify and update customer records and reduced the time between meter reading and billing from 3 months to 1 month.

A preliminary analysis of the prepayment metering system and the new conventional “Custima” billing system indicates the system has a financial advantage and also has had some demand impact. With a collection rate of about 74 percent in the Dar es Salaam area, the prepayment system has a 8-10 Tsh/kWh advantage, amounting to Tsh 1.7 billion per year. The payback period for the investment is about 3 years. A comparison of the two systems indicates the prepayment system has somewhat dampened demand with average sales at 59-61 Tsh for the prepayment customer base compared to 69 Tsh/kWh for the conventional system customer base.

The *new computerized accounting system* financed by the project (SCALA) has replaced Tanesco's former paper-based system. Tanesco purchased four modules: purchases, sales, payroll and general ledger. Project files indicate that much more work was required to clean up the paper-based database than originally envisaged. Also the consultant for the system was stronger in accounting system design and organization than the technology side and computers purchased to run the software apparently were not

powerful enough to handle all the operations expected from the system efficiently. For example, initially the consolidation of accounts took about 72 hours. However, since April 2000 the system has been upgraded. Tanesco reportedly has retained 10 percent of the purchase price as a system performance guarantee.

Tanesco has installed a *computerized system for improved materials management*. It is expected to considerably improve materials management by solving the following problems: (i) lack of timely and reliable information across Tanesco; (ii) purchasing materials with an emphasis on compliance rather than value for money; (iii) simplification of purchasing procedures; (iv) under utilization of space at central stores; and (iv) high levels of obsolete stocks. When fully implemented, the system will be able to track inventory for the whole company, including the movement of items between stores and the costing/valuation of materials.

In support of providing better incentives for management effectiveness, the project helped fill a number of important vacant management positions; conducted a salary study; and reviewed the company's productivity improvement program. Although Tanesco reportedly raised some salaries during the project's implementation period, those of senior staff are still below market levels while those of positions with less corporate responsibility, such as drivers, are considerably higher. In general, Tanesco still needed to give greater attention to performance enhancement.

Part of the motivation problem within Tanesco was the company's uncertain status. It was technically in receivership pending the Parastatal Sector Reform Commission's decisions on restructuring. Also, under the Public Utilities Act of 1992, management was subject to severe penalties for taking any actions that might endanger Tanesco's assets. The uncertainty about the company's future had a negative impact on staff morale as noted by Deloitte, Touche, Thomatsu in its report, Tanesco—Review of Financial Management, July, 2000. This report identified the main management shortcomings in Tanesco, namely focusing too much on "controlling" and not enough on "managing." A particular example mentioned in the report was the following: instead of focusing on the difficult issue of managing the major cost drivers, the management focuses on easier "controllables", such as expenses on travel and printing/stationery.

Impact of institutional Components on ZSFPC and MEM. The project has installed a new billing system for ZSFPC, which has significantly improved the quality of information available to management. As a result, they are able to monitor performance on a weekly basis and sometimes even daily. The system generates data on: daily collections; the number of customers disconnected or reconnected; the number of illegal connections; data on monthly bills produced vs. paid, etc., allowing the company to analyze statistics daily and take timely management actions. The project installed about 8,000 of the 10,000 prepayment meters planned for the system. These account for about 24 percent of the customer base. While project funds were not available to finance the remaining 2,000 meters, given the success of the program, the company has installed additional prepayment meters with its own funds.

Prior to the installation of the meters, ZSFPC did a survey that allowed the company to identify illegal connections and regularize them in the billing system. Given the difficulties Tanesco had experienced with the contractor for prepayment metering, the Bank insisted that the meters for ZSFPC be designed with a distributive computing algorithm to facilitate the accurate implementation of a step tariff. A private sector company is now managing the system and reportedly it is working very well. The other key institutional improvement in ZSFPC was the installation of a computerized accounting system.

MEM also received technical assistance and some technology. This included office equipment such as a telephone system and computers, vehicles and management training. Its impact was modest, however, in improving the skills and administrative efficiency of MEM.

Overall, the ICR rates the achievement of the project's institutional objectives as 'modest'. This rating is predicated on the commitment made by the government - at the level of the President of the country-during the final months of the project to start a process of recruitment of a new management team for Tanesco from the outside; this team subsequently took over the management of the utility in February, 2002. Despite the very weak financial position of Tanesco throughout the project, the decision of the government to take steps immediately to recruit a new management team was a positive step forward in turning around the past institutional performance of the utility. There were also some other gains made in strengthening institutional performance. The developments achieved in the management and operations of ZSFPC were noteworthy and benefited from the work done with Tanesco. The assistance to Tanesco also included large amount of studies, technical assistance and computerized management tools, which made a substantial contribution to Tanesco's operational capability. In particular, the development of a regionalized, computerized billing system was a considerable accomplishment since it should facilitate the planned unbundling and privatization of the company. Furthermore, the expansion of the prepayment metering system from the original pilot provided a technical solution to ensure collection from about 14 percent of the company's customer base.

Financial Objectives

The project's statement of development objectives contains no explicit financial objectives. However, the project did include a number of covenants which aimed at improvements in Tanesco's financial management effectiveness: the amount of funds for capital expenditures generated from internal resources; rules governing capital expenditures outside the agreed power sector investment program; tariff increases to offset inflation; limits on the number of days of receivables and acceptable debt levels. Tanesco was to achieve internal cash generation as a share of capital expenses as follows, by fiscal year: 25 % for 1994; 20 % for 1995; and 30 % for 1996-98. Supervision reports indicate that Tanesco made only limited progress towards reaching and maintaining these targets. Both a Deloitte, Touche, and Tohmatsu report and a Bank power sector performance mission in August, 2000, documented in detail the major financial shortcomings of Tanesco. **For this reason, the ICR has rated the achievement of the financial objectives as 'negligible'.**

During the project period, Tanesco entered into a contractual arrangement for purchasing power (up to 100MW) from an independent power producer, IPTL, based on hugely overstated investment costs and costly and outdated technology. The agreement was fully endorsed by Tanesco's Board which was, in turn, controlled by the government, Tanesco's sole shareholder; the Bank, however, was not informed of this decision. When the Bank eventually became aware of this arrangement and realized that Tanesco's financial viability could be threatened by the terms of the agreement, it advised the government to take action to maintain the financial viability of the sector. The Government and Tanesco eventually sought legal assistance (financed under the Power VI project), went to international arbitration, and came to a settlement with IPTL.

Tanesco was to not incur any debt unless a reasonable forecast of revenues and expenditures showed that net revenues for each fiscal year would be at least 1.3 times the debt service requirements. Tanesco remained within its debt service requirement. Tanesco's receivables, according to the legal agreements, were not to increase beyond the level of 75 days of sales revenues. Tanesco did not reduce its receivables to the level in the agreement though it did reduce them in comparison to the level at appraisal: from the equivalent of around 200 days of sales to about 90-120 days of sales. Concerning tariffs, Tanesco completed a tariff study and raised the average tariff to meet the LRMC of supply.

The Government also was to take measures to improve Tanesco's revenues, mainly ensuring compensation for: shortfalls in payments from the ZSFPC; lack of payment from consumers that could not be disconnected for humanitarian reasons; and any investment considered socially desirable from the Government's point of view but not economically viable. Though the Government intermittently made payments to reduce outstanding amounts owed and its performance improved towards the end of the project's implementation, overall the Government's compliance with financial covenants was 'unsatisfactory'. The Government did not fulfill this obligation during the project's execution.

Overall, the project did not meet its main financial indicators. However, the reason for this was due mainly to factors outside the control of Tanesco: periods of drought that increased system costs; delays in the completion of the accounting and billing systems due in part to consultant performance; and lack of sufficient support from the Government to allow the company to operate independently. Towards the end of the project the original financial indicators became less meaningful with the realization that finances were not likely to improve without sector restructuring and privatization.

According to a financial management analysis of Tanesco's collections problem, about 75 percent of the problem is political requiring direct intervention of the Government given Tanesco's limited ability to disconnect customers for non-payment. Another 20-22 percent is a normal collection problem which Tanesco should be able to fully manage. The remaining 3 percent is likely non-collectable due to non-performance or demise of the debtor enterprise. In the last year of the project, the Government managed to clear its arrears with Tanesco and granted the company the authority to disconnect Government agencies for non-payment.

Finally, Tanesco did fulfill the project's tariff covenant by raising the average tariff. However, it did not fully implement the tariff study's recommendations, notably those concerning the cross-subsidization of residential consumers by industry, largely due to factors outside the company's control.

Privatization Objectives

The project was cautious in its design of the restructuring and privatization components, calling for the completion of a study and the development of a plan based on its findings but with no dated privatization covenant. A set date would have been premature given that the process was new for both the Bank and the Borrower. The project completed the restructuring study but found it inadequate for deciding on how to restructure the power sector in Tanzania and privatize Tanesco. There were two reasons for this. First, the justification for recommendations was weak and there was no realistic strategy for attracting private sector investment. Second, it did not evaluate the option of separating Tanesco's generation function from its transmission and distribution functions, allowing it to compete with the Independent Power Producers for generation contracts with the transmission and distribution companies.

After reviewing the study, the Bank and Borrower agreed on a new plan of action for evaluating alternatives –conducting a study tour of successfully privatized utilities and examining their restructuring programs. Following the study tour, a workshop took place during March 1998, in Tanzania. It reviewed developing country experience and presented the case of Bolivia, which restructured and privatized its electric power industry in about three years. This case study included: the need for and outcome of structural reform; the creation of the necessary legal and regulatory framework; and current regulation in the Bolivian power sector. Other topics included: unbundling of a power utility; organization of the government for handling privatization tasks; privatization objectives and methods of sale; and selection of advisory services. As a result of the study tour and workshop, the Government opted for private sector generating companies competing for contracts and the use of a single transmission company, with open access, which would in turn sell power to regional distribution companies.

Following the workshop, the Government formulated a set of sector objectives and strategies, which the Cabinet approved in 1999. The policy work and decisions on a sector structure in the context of the Power VI project provided preparatory work for the energy sector in the Bank financed privatization project for government entities and parastatal companies in Tanzania. Some reorganization of Tanesco, in preparation for privatization, already began under the project. The company divested itself of its non-core pole construction business and installed a decentralized, computer system by distribution zone.

In addition to privatization of the power sector, the project supported privatization in the gas sector. The promotion of private gas development for electricity generation was important for enhancing the security of electricity supply by diversifying the hydro-based system and providing a low-cost thermal generation alternative to oil-fired power plants. The Ministry also financed technical and legal services for gas resource development in the Songo Songo and Mnazi Bay areas. It financed US\$14.8 million of legal and technical services for the preparation of the Songo Songo project, including approximately US\$8.0 million for well testing. The component to support Mnazi Bay development was reduced because of preliminary findings that indicated the well might not be economic to develop. However, project studies increased the knowledge of the well, which helped make the decision not to develop it.

Overall, the ICR has rated the achievement of the private sector development objectives as 'modest' The project led to: formal government adoption of a privatization plan for the power sector; partial divestiture of Tanesco's non-core activities; increased knowledge of the gas resource base for private sector development promotion which, in turn, led to the preparation of the Songo Songo Gas Development and Electricity Generation Project. However, any privatization of Tanesco remains at least two years in the future. The present, constrained external investment climate makes this objective, at best, uncertain.

Environmental Aspects

Regarding the application of the Bank's safeguards to this project, the ICR takes into account guidelines in effect at the time of project appraisal. According to those guidelines (OP 4.01, October 1991), the project required a full environmental impact assessment (EIA). The objective of this assessment was to improve decision making and ensure that the project options considered were environmentally sound and sustainable. It was to identify measures for improving projects environmentally by preventing, minimizing, mitigating, or compensating for adverse impacts. The guidelines also state that these measures are "generally in the form of an environmental mitigation plan." The guidelines also state that the detail and sophistication of the analysis should be commensurate with the expected impacts.

In the case of the Power VI project, the EIA -- which covered the usual range of impacts --flora, fauna, human settlement activity-- determined that the overall environmental impact of the project would be

relatively minor compared to most dam projects and that a key factor in selecting the site was that it was preferable to others in the same area, on an environmental basis. Because of the expected low level of impact, it did not prepare a mitigation plan; nor did it look at any impact on vegetation downstream of the planned dam which would comprise an integral part of an EIA carried out under current Bank guidelines. Nevertheless, the Bank's Board accepted this approach in approving the project. However, it was recommended that Tanesco develop an environmental monitoring capability. Such a capability would evaluate any unforeseen impacts that developed during project implementation and was in line with lessons learned from past projects that continuous environmental monitoring was important. The project also included a covenant to produce an environmental mitigation plan during project implementation (1994). Tanesco's mitigation plan took the form of a continuous environmental monitoring project managed by consultants.

On September 17, 1996, Tanesco and Norplan, its consultant, signed the "Agreement for Consultancy Services for Environmental Issues Financed by NORAD." This monitoring work included the funding of an environmental program consisting of three projects funded by NORAD: (i) the MUAJAKI Public Health Project; (ii) the Preparation of a Catchment Management Plan Project; and (iii) Long-term Monitoring of the Natural Environment (Kihansi Gorge) Project. In addition, the Swedish International Development Agency (SIDA) funded a socioeconomic follow-up project while the World Bank, in July 2001, provided financing for the LKHP Environmental Management Project.

Long-Term Environmental Monitoring. The objectives of this project were the following:

Data Collection and Assessment

- Evaluate biodiversity values of the Kihansi Gorge and nearby areas;
- Determine the absolute impact of the project on local biota;
- Provide initial data required to determine presence of the project in the Kihansi Gorge ecosystem and the impact of its long-term operation;
- Develop data and recommendations for determination of bypass flows; and
- Evaluate relative changes in the ecosystem of the Kihansi and Udagaji Gorges.

Environmental Planning and Management

- Provide guidance on the use of the project area by the local population, through the development of a project area resource use management plan;
- Contribute to the increased environmental awareness of Tanesco;
- Enhance the ability of the National Environmental Management Council (NEMC) and the Rufiji Basin Water Office to determine permitting criteria for water management projects;
- Contribute to increased environmental awareness by Tanesco; and
- Determine the impact of project activities on the presence of malaria vectors and associated human health consequences in the upper project area and the Udzunwa Plateau, and develop appropriate mitigation recommendations

Throughout project implementation there were three key issues in environmental planning and management. The first was the need for measures to save the Kihansi Spray Toad after it was discovered in the gorge in late 1996 as well as preserve its ecosystem from extinction, due to the project's diversion of water from the Kihansi Falls to running the power plant's turbines. There were three main activities to conserve the toad, which project donors financed: (i) rehabilitating the habitat through the installation of a pilot spray system to re-create adequate moisture conditions created by the natural spray from the falls prior to the operation of the power plant; (ii) conducting searches for similar habitats in Tanzania and translocating the toad; and (iii) breeding the toads in captivity as an emergency measure to preserve the species while the other two investigations were in progress.

The second issue concerned the water rights for the project, namely, the allocation of water resources between the Lower Kihansi Power project's generation needs and the ecosystem whose conservation was dependent on spray generated by the waterfall in the Kihansi Gorge. Because of the limited capacity of Tanzania's water authority, it was the practice in the country to obtain a provisional water right to begin construction, leaving the final determination until a later time. However, this practice resulted in a major dilemma during project implementation once the Kihansi Spray Toad was discovered, which in turn gave rise to discussions addressing the appropriate energy/environmental trade-off in the use of the water. In January 1996, Tanesco received the provisional right to dam the river and extract 41.5 cubic meters per second from the Kihansi Falls for power production but it was required to maintain a bypass flow of 7.7 cubic meters per second on a daily basis. Tanesco contested this bypass flow and applied for a minimum bypass flow of 1.5 cubic meters per second, as recommended by its consultants, to ensure that the power plant would meet the physical objectives of the project. However, the Office of the Vice President also advised Tanesco of the need to maintain this flow given concerns about the Kihansi ecosystem and Tanzania's obligations under the International Convention on Biodiversity. The issue of the level of the minimum bypass flow was not resolved. Meanwhile, construction of the dam continued until commissioning in June, 2000.

In May, 2000, the Managing Director of Tanesco wrote a letter which stated that "...considering the fact that the Government has already invested heavily in this project and further that the power supply situation in the country is not good because of water shortage in our existing power reservoirs, it would not be within the national interest to divert 7.7 cumecs (cubic meters per second) from the generation of electricity. It is worth to note that the flow at Kihansi is normally between 7 and 12 cumecs during seven months of the year and one turbine of 60 MW needs 8.3 cumecs to fully operate. Therefore, the release of 7.7 cumecs for environmental purposes would be tantamount to closure of the power station for a considerable portion of the year." Since the commissioning of the first 60 MW unit at Kihansi in June 2000, Tanesco has been maintaining the bypass flow at nearly 2 cubic meters per second and has been investigating a variety of measures, including the full time operation of artificial sprinkling systems, to preserve the Kihansi ecosystem. At the time of project closing, TANESCO's final water right was still pending and the amount of bypass flow necessary for the Kihansi Spray Toad to survive had not been determined. The unresolved issue called attention to the need for more effective coordination in Government decision-making on national resource issues. The provisional water right, requiring a minimum bypass flow of 2 cubic meters per second, was recently extended to October 2003 while flow tests at the sites continue.

A review of the project's environmental impact by the Bank and independent consultants- Lower Kihansi Hydropower Project Environmental Review, Final Report. August 17, 2000- considered a variety of options. They evaluated the environmental/energy trade-offs of water flows to the plant and to the ecosystem of the Kihansi Spray Toad. The recommended option was to keep the bypass flow between 1.51 and 1.89 cumecs combined with a program of ecological management, which would have a cost of

US\$5.76 million over a five-year period. Initially, the review noted that even with this option there was still some threat of extinction. At the time, the captive breeding program was experiencing difficulty and the effectiveness of the spray system was uncertain. In the intervening period to late 2002, the population of the toads- both in the breeding program and especially in the gorge- has increased considerably.

The third issue concerned the encroachment on the forest resources in the project area due to increase in the population during the construction period and continuing through the operational phase. To reduce the potential impact, Tanesco arranged to house the project workforce at a town 30 km away from the project site and bring them to work by bus each day. However, the reports of Tanesco's consultant, Norplan, have continuously noted the need to improve the patrolling and protection activities of Tanesco, noting increased resource extraction, notably wood cutting and hunting.

MUAJAKI Public Health Project. The objectives of this project were to:

- Avoid increases in: the rate of transmission of sexually transmitted diseases; malaria morbidity and mortality; unsanitary disposal of human excreta and refuse; maternal and childhood health problems; health problems associated with alcohol and drug abuse; and traffic and construction related accidents;
- Monitor progress of the various activities described in the contract; and
- Provide recommendations on the extension of the objectives into the operational phase of the Lower Kihansi Hydropower Project.

This program took place over a five-year period, --from September 1996 to September 2001-- focusing on health improvement and disease prevention measures for 18 villages in the project area. A combination of measures for malaria prevention, increased HIV/AIDS awareness and condom sales, improved sanitation facilities, and occupational safety precautions have improved the overall health indicators of the villages covered by the program relative to those of other villages monitored. Both the death rate and the birth rate in the region have fallen below the average for Tanzania.

Preparation of a Catchment Management Plan. The objectives of this project were to:

- Prepare a Catchment Management Plan consisting of a monitoring system and a broad, participatory planning process; and
- Prepare a project proposal for an implementation of the management plan.

The project used remote sensing techniques to establish baseline data for activities to prevent soil erosion. The local population benefited from extension activities to use agricultural practices that minimize soil erosion and received assistance in a large-scale tree planting exercise. Farmers received both fruit tree seedlings from cash crops and pine seedlings to produce construction timber and firewood. The project used fast-growing seedlings to produce quick results. The program is nearly self-sufficient and requires relatively modest inputs for fast gains.

Socioeconomic Follow-up Project. The objectives of this project were to:

- Enhance the capacity of local communities and individuals to adapt to socioeconomic changes;
- Report on direct and indirect socio economic impacts of the project;
- Recommend mitigation activities for impacts; and
- Proposals for donor funding of mitigation efforts for local implementation by local government, non-governmental organizations, communities and other agencies.

This program has focused on safeguarding the welfare of people in the communities in the area around the power plant – mainly six villages in the direct impact zone of the plant. It has both monitoring and mitigation components. The monitoring component has documented not only the socioeconomic and cultural changes due to the sudden influx of people and resources into the area but also is doing follow-up work on what happens when the construction boom in the area comes to an end. The mitigation component encompasses promoting and sustaining access to health services, schools and water supply. It also has provided a micro credit facility to promote small business activities, particularly among women and youth. The program, though relatively small, was very successful in mobilizing local resources and commitment.

Overall Environmental Impact.

During project implementation, the Bank received criticism from external environmental organizations for not stopping construction of the project until the new impacts identified during project implementation were resolved. Initially, the Bank was very slow to react to the growing environmental concerns raised by these organizations; nor did the supervision reports provide much indication of the potential risk for the Bank of these concerns. While both the Borrower and the Bank shared these concerns in regard to the Kihansi spray ecosystem, they did not agree that construction should be halted, given Tanzania’s urgent need for power and the fact that both the Bank and the Borrower, at the time of appraisal, had accepted the possibility of some habitat loss initially. Moreover, the need for additional power capacity became increasingly more urgent as Tanzania faced a severe drought with the likelihood of extreme load shedding. Also, the lack of any baseline data to indicate just how much water the ecosystem needed to survive was a further complication in determining the appropriate bypass flows.

As shown in Table 4.1, during the construction period of the Lower Kihansi power plant, the Bank and the Borrower, with bilateral donor funds under the project, were examining, testing, and evaluating ways to preserve the ecosystem. Tanesco, with bilateral donor assistance, spent about US\$4 million on monitoring and mitigation activities. The project files contain detailed studies, including analyses of the size of droplets in the artificial spray system. In the end, however, as outside concern continued to grow amongst the international environmental community, the Bank approved an Environmental Management Project in July, 2001 to help ensure the sustainability of the gorge's ecosystem.

Initially, there were reports that a large percentage of the spray ecosystem had been lost in a short period of time, evidence of the system’s extreme fragility. Furthermore, early reports on captive breeding had indicated that a parasitic infection had seriously threatened the survival of toads in captivity. However, in April 2002, the Bank's Internal Advisory Panel (IAP) for the Lower Kihansi Environmental Management Project (LKEMP) met to review the status of this project. The IAP reported that overall the results of captive breeding were satisfactory, despite some initial difficulties. The panel reported site visits had found that the vegetation in the wetland was once again green and that Kihansi Spray Toads were visible in the upper gorge.

**Table 4.1
Chronology of Environmental Work on the Lower Kihansi Hydro Site and Plant Construction**

Year	Environmental Work	Kihansi Construction
1992-93	Environmental Assessment completed synthesizing the work of Ekono Energy, Tanesco, and the World Bank	Panel of Experts for dam construction meets in 1992 and

		makes the first field visit in 1993.
1994-95	Two environmental organizations express concern about an ecosystem dependent on the spray from the Kihansi Falls. Project consultants respond by conducting baseline studies. Tanesco expresses concern to the Bank about letters received from environmental organizations requesting deferral of project construction. Baseline studies arrive at findings similar to the earlier environmental assessment. Bank environmental staff note concern but also point out that the Bank and the Borrower had accepted some loss of habitat as a consequence of the project, pointing out that all construction projects have some environmental costs.	The development of dam infrastructure begins in 1994.
1996	March: Tanzania ratifies the International Convention on Biodiversity. This convention obligates the country to take all measures within reason to preserve unique species. However, it also notes the need to balance this with human needs. August: Tanesco contracts with Norplan for a continuous environmental monitoring project. December: investigations near the project site discover what appears to be a unique spray-dependent wetland.	January: Tanesco receives the rights to dam the river maintaining a bypass flow of 7 cubic meters per second, the historical minimum for the Falls.
1997	Work on the design of a system to re-create the spray to support the ecosystem begins. November: scientists make further field visits to learn more about the spray dependent ecosystem.	Excavation for the Lower Kihansi Dam begins. September: Bank gives its “no objection” for beginning the civil works for Kihansi. Note: In 1997 there is severe load-shedding, enhancing the importance of completing the construction of the power plant, which was originally planned for 1998.
1998	February: Norplan’s environmental monitoring report makes reference to an apparently unique species of toad discovered in the project area. June: Tanesco and Norplan begin investigations of ways to conserve the spray toad – artificial irrigation, translocation, captive breeding, etc. October: Scientist search for other areas where the toad may exist.	
1999	Early 1999 (or late 1998). Scientist announce, in an academic journal article, a critically endangered species of toad in the Kihansi area.	Gates and bypass of the dam commissioned.

	<p>August. Norplan's environmental monitoring report discusses options that would balance the need for water to run the power plant with the needs of the spray dependent ecosystem.</p> <p>November. World Bank receives a letter from an environmental organization expressing concern about the endangered ecosystem and the construction of the project.</p> <p>December. Bank management sends holding letter to permit time for stakeholder consultations.</p> <p>End 1999. Tanesco instructs Norplan to study the impact of the reduced flow on the ecosystem. However, it turned out that an accurate study was only possible after the commissioning of the first turbine.</p>	<p>First turbine for the power plant commissioned and spray system installed to compensate for diversion of water for power production.</p>
<p>2000</p>	<p>March. The Bank formally responds to the environmental organization's concerns and agrees to conduct a formal review of the project's environmental aspects. An Internal Advisory Panel (IAP) is established to provide advice to supervision team and monitor progress.</p> <p>April. Mission visits Tanzania to conduct the Environmental Review. Sprinkler system for the mid-gorge completed and the one for the lower gorge begins.</p> <p>May. The Office of the Vice President of Tanzania sends a letter to the Ministry of Water, noting Tanzania's obligation to protect biodiversity and requests that the flow be at the historical level of 7.7 cumecs. Tanesco responds that this level of flow is not in line with the recommendations of consultants and other government organizations that have discussed the matter. The company points out that a bypass flow of 7.7 would be tantamount to shutting down the power station and notes the need to evaluate the economic and financial consequences of such an action.</p> <p>August. Bank environmental review proposes a flow level that is likely to protect the ecosystem and meet the country's power needs. The Bank sends a letter to the concerned environmental organization and presents this finding, noting the Bank's intention to finance a project to implement a package of actions to protect the Kihansi Spray ecosystem.</p> <p>September. The Government of Tanzania expresses commitment to proceeding the recommended option of the environmental review.</p>	<p>July. The last of the three 60-MW turbines installed and the President of Tanzania inaugurates the power station.</p>

4.2 Outputs by components:

Since the project's appraisal prepared an SAR rather than a Project Appraisal Document (PAD), the discussion in Section 4.1 focuses on the achievement of project objectives, rather than on specific outcomes or outputs, in accordance with the following categories: tariff policy, physical, institutional, financial and privatization. Included in Section 4.1 is a discussion of the impact of particular components that were part of the original project description.

4.3 Net Present Value/Economic rate of return:

The project's SAR calculated an economic internal rate of return (EIRR) on Tanesco's investment program since most of the project funds financed a time slice of Tanesco's power system investment program. The SAR projected an EIRR of 15 percent on the base case investment program. It also calculated a low-case demand scenario which resulted in an EIRR of 12.9 percent as well as scenarios for delays in Kihansi construction and increased investment costs, which resulted in EIRRs of 12.5-14.4 percent.

The ICR's re-estimate of the EIRR is 10.6 percent. The rate is lower than that in the appraisal report due to sales that were about 14 percent lower than the low-case in the SAR, the reduced output of the Kihansi plant due to the need to increase by-pass flows, and the inclusion of unforeseen environmental work financed under the Bank's Lower Kihansi Environmental Mitigation Project.

4.4 Financial rate of return:

Not Applicable

4.5 Institutional development impact:

The achievement of the institutional development objectives are discussed in detail as part of section 4.1. The institutional development impact has been rated overall as 'modest', essentially because of the decision by the government in the final months of the project to initiate the recruitment of an outside management team for Tanesco. Despite the very weak financial position of Tanesco by project completion, this decision represented an important step forward in turning around the institutional performance of the utility. In support of this judgment, a new management team took over Tanesco in February 2002 and has led to immediate improvement in the utility's operational and financial performance.

Other institutional impacts should be mentioned. The project provided Tanesco with the tools to improve its technical and commercial operations. In addition, the project helped define options for power sector restructuring and based on a review of these options the government has decided on a basic structure. This structure is in line with the Bank's principles for power sector lending. The Cabinet has approved restructuring along those lines. However, the Government did not provide, until late in the project, the support and commitment that was critical to making Tanesco a commercially viable company during the transition to the new sector structure and privatization of the utility. It needs also to be recognized that Tanesco's management also did not do all in its power to improve performance of the utility. Indeed, it was this fact that led supervision missions to recommend acceleration of the sector restructuring and privatization efforts and Bank country management to press for a new management team to be recruited for Tanesco during a transition period en route to privatization.

5. Major Factors Affecting Implementation and Outcome

5.1 Factors outside the control of government or implementing agency:

There were two major developments during project implementation that had an important bearing on implementation and project outcome: the severe drought during 1994/5 and the discovery in the gorge of an endangered species, the Kihansi spray toad, in 1996.

1. Unexpected Severe Drought Conditions. At the time of project appraisal, Tanesco's capacity balance – the margin between available capacity and maximum demand – was negative and was projected to remain so with slightly positive capacity during 1994 and 1995. (Staff Appraisal Report, Tanzania Power VI project, para. 3.17.) This situation resulted from two factors: reduced hydro capacity due to drought conditions and the delay in rehabilitating some of the diesel units in the system. Tanesco was looking at identifying options to reduce demand, such as voluntary load shedding and encouraging some industries to use their own generation. Also a demand management study by the Energy Sector Management Assistance Program (ESMAP) was to assist Tanesco in managing peak loads and energy consumption efficiently. The capacity balance analysis showed that there would be just a slight margin of capacity beginning in 1994 until 1998, when the Lower Kihansi hydro plant was to come on stream. The analysis suggested that depending on options for reducing peak load, additional thermal capacity might be necessary, especially if there were a delay in the commissioning of the Lower Kihansi hydro plant.

About a year or so after the project's appraisal, unusually poor rainfall led to severe drought conditions, not foreseen at project appraisal. These conditions-- combined with higher demand growth due to faster economic recovery than anticipated -- resulted in widespread outages. This loss of capacity was costing the country the equivalent of about US\$ 170 million in economic losses annually, close to 8 percent of the country's GDP. Therefore, the Bank agreed with the government's request to fund the Emergency Power Program (EPP) to provide critical thermal back-up capacity. This action was in line with the overall project objective of meeting power needs at least cost. An important consequence of this decision, however, was to reduce significantly funding available for distribution strengthening and rehabilitation.

2. Discovery of an Endangered Ecosystem at the Kihansi Falls. The legal documents of the Credit Agreement required that an Environmental Management Plan (EMP) be prepared by June 30, 1994. As part of the preparation of the EMP, a number of baseline studies were undertaken by Tanesco's consultants as well as a more detailed EIA of the project, focusing in particular on the downstream impacts that some NGOs in cofinancing countries had felt were not adequately addressed in the original EIA (Section 3.5 Quality at entry, Environmental Impact Assessment). By late 1995, following conclusion of these studies, it had become clear that diversion of water for the hydroelectric scheme would also have an impact on vegetation downstream of the dam. Subsequent to completion of baseline studies, a team of scientists, financed under the project, visited the site and discovered not only a specialized spray wetland but also a new species of dwarf toad, *Nectophrynoides Asperginis*, which became known as the Kihansi spray toad. Because of the impending alteration of the local microclimate as a result of the dam construction, it was recommended that the Kihansi toad be classified as a 'critically endangered species'. It was not until June 1998, however, that Tanesco was officially informed that the discovery of the Kihansi Spray Toad was unique to the project area and was considered an endangered species. The discovery of the Kihansi Spray Toad and an endemic plant ecosystem, together with the concerns expressed to the Bank in a letter by a non-governmental environmental organization in November 1999, led to a reassessment of the project's environmental impact. With the main dam construction now well advanced, attention turned to identifying urgent measures to help ensure the long-term survival of this species in the Kihansi gorge. These measures subsequently formed the basis of an emergency mitigation plan which the Bank helped finance in a separate lending operation that was approved in July 2001, just after the closing date for Power VI. The main mitigating activities identified were: re-creation of the spray with an artificial sprinkler system; a search for the same species of toad in other areas of Tanzania; a captive breeding program for the Kihansi spray toad; and the determination of minimum environmental flows through the gorge.

There were also a few additional factors that affected aspects of project implementation and project outcome.

a. Changes in the Kihansi Hydroplant Design. Some delay in construction of the Lower Kihansi Hydroelectric Plant resulted from unexpectedly low rock stresses in the planned location of the underground power house. Tanesco responded quickly to address the problem and changed the project's design, making effective use of the advice from the project's Independent Panel of Experts. The solution was to place the powerhouse about 700 meters from its original planned location underground. There were also some problems with the contractor's performance, which led to the hiring of a new site manager. The delay in the construction due to these problems was about six months. The consultants, managing the project for Tanesco, had anticipated possible construction problems because of difficulties encountered during site exploration and preempted high cost overruns for shifting the cavern by using an innovative flexible contracting approach.

b. Inadequacy of the Restructuring and Privatization Study. Because the restructuring study was inadequate the Bank and the Borrower had to prepare other activities to help meet the project's restructuring objectives. The solution they came up with was a study tour of selected countries which had success with power sector restructuring and privatization and a workshop to analyze the results. This

required seeking donor funding and delayed progress in restructuring, but was successful in helping the government decide on the most viable power sector restructuring option for Tanzania and in preparing a plan for restructuring prior to the closing of the project.

c. Configuration Problems with the Prepayment Metering System. Project supervision reports indicate that there was a configuration problem with the prepayment metering system, such that it did not take into account the structure of step tariffs as was specified in the contract documents. The contractor had assured Tanesco and the consultant for the system that the supplied system met the specifications fully. However, during supervision, the Bank reviewed the operation of the system and determined that it was defective. The Bank provided Tanesco with a report on the matter and asked the company to formally request the contractor to resolve the problem since it was causing some of Tanesco's customers to be overcharged.

d. Delays in Operating the New Accounting and Billing Systems. In 1996, the new accounting system began operating in the headquarters of all of Tanesco's zone offices. The original plan was to decentralize the system over a period of six months with completion around June 1997. However, more work on the system was required than anticipated originally and the consultant did not have an adequate grasp on the information technology aspects. As a result, billing system delays occurred due to the larger than expected amount of work required to re-establish the customer data base as well as the fact that the program purchased was not very user friendly.

5.2 Factors generally subject to government control:

Government Commitment to Sector Reform. The Government showed its commitment to reform by completing the restructuring study under the project as well as the related study tour of senior managers and workshop. Subsequently, the Cabinet approved the restructuring of the sector in 1999 and Parliament then passed the Energy and Water Utilities Act in April 2001 establishing the multi-sector regulatory agency.

Lack of Demonstrated Commitment to Support Tanesco's Commercial Viability. The Government was required to play a pivotal role in making Tanesco financially viable prior to sector restructuring. In order for the investment, technical assistance and training in operational improvements to be effective, Tanesco required Government actions to ensure payments by government entities for electricity used as well as compensation for socially important but financially unviable rural electrification programs that the Government directed the company to implement. For most of the period of project implementation, the Government did not take such steps. However, the Government did provide intermittent compensation when pressed by Bank, especially when the Bank gave an official warning that it would suspend disbursements if the Government did not comply with related covenants.

Adherence to the Convention on Biodiversity. In 1996, the Government of Tanzania signed an international convention on biodiversity. This convention requires a signatory to make every effort, within reason, to preserve the biodiversity of its resources. The signing of this convention became an important issue when the discovery of an endangered Kihansi toad was made and the urgent preparation of an environmental management project mentioned in section 5.1 above. The Government and Tanesco have since committed themselves to a program that balances the country's need for power with programs to protect the habitat of the Kihansi Spray Toad and rare varieties of plant life dependent on the spray from the Kihansi Falls.

5.3 Factors generally subject to implementing agency control:

Contracting for Thermal Power from ITPL. During the project's implementation, the Government of Tanzania entered into an agreement for Tanesco to purchase power from an independent power producer,

Independent Power Tanzania Limited (IPTL). The agreement reached financial closure in June 1997. The Bank was not aware of this contract until after the fact. The Bank's supervision mission of October 1997 notes that studies of the project had indicated it would provide 100 MW of surplus power and was not part of the least-cost expansion program. The Government gave a presentation on the project in October 1997 stating that the addition of 100 MW would be prudent to prevent power shortages. The Bank requested the Government to show that the introduction of the project into the sector to be economically, financially and technically sound and that its introduction would not threaten the financial viability of the power sector nor its further development at least cost. The Bank notified the Government that the IPTL project posed a serious threat to the objectives of Power VI and, under threat of Bank suspension of disbursements on Power VI, the Government sought arbitration on the agreement, a process that lasted several years. While Tanesco purchased no power from IPTL during the project period, following the outcome of arbitration it now has a contractual obligation to purchase minimum quantities of power from IPTL, on a take-or-pay basis, that will have repercussions on its future financial position and the cost of electricity for Tanzanian consumers.

Delays in the Submission of Audit Reports. During most of the project's implementation, supervision documents reported the project audit reports as late. The lack of regular audit reporting made it difficult to monitor Tanesco's financial situation consistently. However, part of the problem was attributable to the fact that systems to improve performance in audit reporting were being installed under the project; until these systems were functioning properly, limited progress in the audit reporting was possible.

Water Rights for the Lower Kihansi Plant Operation. In early 1996, Tanesco received a provisional water right that required a bypass flow in the gorge of 7 cubic meters per second. This figure was stipulated on the basis of historical low flow levels. Tanesco was able to comply with this right until the commissioning of the Lower Kihansi Plant in December 1999. In order to operate the plant to meet the project's objectives, Tanesco could only release about 1.5-1.8 cubic meters per second without seriously compromising the ability of the plant to meet power demand. Tanesco applied for a right to the reduced flow but did not receive it during the project implementation period due to ongoing water rights discussions and the need to determine the minimum environmental flows required to preserve the ecosystem that had been dependent on the spray from the Kihansi Falls. This issue of Tanesco's water rights has yet to be resolved. The provisional water right for a flow of 2 cubic meters per second was recently extended until October 2003 while flow tests continue at the site.

5.4 Costs and financing:

In 1993, IDA approved a credit of SDR144.2 million, the equivalent of US\$200.0 million. The project's total cost was estimated at USD383.7 million and other financiers were NORAD, Sida, NDF, DfID, EIB and KfW. In April, 1995, the Government of Tanzania requested an amendment to re-focus part of the project activities to help TANESCO forestall serious and widespread power outages in 1995 and afterwards. Approximately US\$42.0 million of the credit was required to purchase 70 MW of gas turbine capacity. The financing of three components was reduced (Distribution Strengthening and Loss Reduction, Distribution Rehabilitation and Mnazi Bay) and reallocated to finance the EPP. The final cost of the project was approximately US\$391.8 million.

6. Sustainability

6.1 Rationale for sustainability rating:

A key element affecting the sustainability of the original project objectives, specifically the institutional

development objective, is reasonable assurance that Tanesco will be able to operate on a commercial basis, generate sufficient funds to maintain its physical investments, and make effective use of the management tools the company acquired under the project. This did not take place during the implementation of the project and for this reason the sustainability of the institutional development objectives has been rated 'Unlikely'.

6.2 Transition arrangement to regular operations:

A key factor in the transition of the project to regular operation is a change in the relationship between the Government and Tanesco, in particular the need for the Government to pay its electricity bills and allow Tanesco to disconnect non-paying customers. The restructuring of the power sector began under the project with the Government's adoption, in October 1999, of a power sector reform program. This program calls for the unbundling of Tanesco, both vertically and horizontally, into generation, transmission, and distribution businesses. Its objective is to introduce private investors into the sector and separate any noncommercial rural electrification programs from Tanesco's regular operations. The Bank is supporting the implementation of the reform plan through the Private Sector Development Project (Credit 3304-TA). The completion of Tanesco's divestiture is expected by the end of 2005.

Prior to restructuring, the Government has either taken or has agreed to take a number of measures to improve Tanesco's operations and financial performance, making the company more attractive to potential private investors. In early 2000, the Government began a program of payments to eliminate its arrears with Tanesco and by early 2001 had reconciled all outstanding electricity bills. This reconciliation includes offsetting Tanesco's outstanding debt service payments owed to the Government. In May 2000, the Government commissioned Deloitte, Touche Thomatsu to assess Tanesco's financial management performance. The company's report highlighted a number of shortcomings in performance and a follow-up Bank mission, in August 2001, confirmed the study's findings. The main areas for improvement that the study identified are: financial controls and accountability, expenditure control and the need to rebalance the structure of electricity tariffs, removing heavy subsidies that industrial customers are paying to offset low tariffs to some residential consumers. The Government and Tanesco plan to implement recommendations in these areas to increase the value of the utility in preparation for privatization in the next few years.

The Government already has taken several steps to mitigate against adverse financial consequences of large-scale Government non-payment of its electricity bills. In July 2000, the Government made its agencies and parastatals responsible for their own electricity bills. Furthermore, Tanesco has received authority to disconnect non-paying Government customers except for five "sensitive" agencies.

The Government has also made significant changes to Tanesco's Board of Directors; these changes indicate a commitment to commercial operation. In August 2001, the Government replaced Tanesco's Chairman and Board of Directors. Of the nine new Board members, two thirds are from the private sector. As noted above, in February 2002, a private firm was engaged on a performance-based contract to manage Tanesco. The sum of the actions already taken by the Government, combined with the management contract and the implementation of the recommendations of the financial management study, should help ensure that the systems provided under the project are effectively used to sustain its objectives. Given continued commitment of the government as well as adequate financial resources, Tanesco now has a reasonable prospect of meeting increased demand at least cost and achieve the financial goals that it could not meet during the project implementation period.

7. Bank and Borrower Performance

Bank

7.1 Lending:

The technical aspects of the project were very well prepared and received considerable study prior to appraisal. The project's design incorporated lessons from past projects concerning the importance of having an independent review of technical design and periodic reviews by an independent panel of experts. The SAR correctly evaluated the technical risks and, as anticipated, had to make some adjustments in the design of the powerhouse due to geological findings. The project also benefited from an engineering credit for the project's generation component and ESMAP studies supporting the distribution component and demand management.

On the institutional side, the project included a multifaceted institutional strengthening program with detailed monitoring indicators and a large number of covenants. However, in examining different options for the restructuring and privatization, and beginning the divestiture of Tanesco, there was an implicit acknowledgement that the existing institutional framework for Tanesco's operations was unsatisfactory and that there was a fundamental need to find a better framework that would allow Tanesco to operate on a commercial basis.

7.2 Supervision:

The Bank supervised the project on average about twice a year. Supervision missions were generally staffed by an engineer, an economist, and a financial analyst; though a Bank environmentalist did join supervision missions on one or two occasions, the monitoring of environmental issues and the preparation of the EMP was entrusted to consultants financed by NORAD. The reports of the supervision missions were strategically focused to deal with particular problems, mainly in the technical and financial areas, which actually resulted from overall management problems.

In general, supervision staff faced a difficult operating framework: a hydro/thermal system that involved operating under a strict regime designed to prevent power shortfalls in drought periods; outdated business management systems; an unreliable information base under reconstruction; and low revenues due to a combination of inadequate billing and collections systems and the Government's non-payment of electricity bills. The Bank project team showed a considerable amount of flexibility in quickly restructuring the project early in its implementation (1995) to meet emergency power needs prior to the completion of Kihansi Plant. This involved a reassessment in priorities resulting in the deletion of some of the project's distribution work. The swift turnaround time in processing the restructuring request and installing the back-up thermal units in about six months, prevented major disruption of the economy through massive load shedding.

Due to delays in improvements to the billing system and frequent problems with arrears in government payments, the Bank proposed a technical solution – new to the Africa Region -- to provide Tanesco with cash. The decision was to install prepayment meters for about 10 percent of Tanesco's clients, especially large government consumers that had a tendency not to pay for electricity. Although this technical solution was not sufficient to turn around the condition of the utility, it did provide a regular stream of cash from some of the larger customers in the system.

At one point, the Bank threatened to suspend disbursements on the project due to the Government's non-compliance with covenants to allow Tanesco to operate as a commercial utility. The Government complied with covenants to ensure IDA payments but only intermittently.

Towards the end of the project's implementation period, the Bank sent specialists to evaluate the management performance of Tanesco and recommend specific, short-term interventions in Tanesco to help bring about rapid improvements in its deteriorating operational and financial performance. This power sector performance mission recommended immediate changes in the senior management of the utility through recruitment of a new management team. As a result, this solution became part of the restructuring component linked to the follow-up project to Power VI – the Songo Songo Gas Development Project. Also, a financial review of Tanesco by an independent consultant came to a similar conclusion and found that there was a lack of initiative within Tanesco, given the pending restructuring of the sector and uncertain future of the staff.

Tanesco's consultants had primary responsibility for monitoring environmental conditions in the Kihansi Gorge. In 1998, they determined the endangered status of the unique Kihansi ecosystem. The problem was complex and unprecedented. Moreover, the expected cost of the needed mitigation work -- especially the efforts at captive breeding of the Kihansi Spray Toad -- was likely to exceed available donor resources. Given the growing urgency of concerns in regard to the preservation of the gorge's ecosystem, the Bank sent an environmental review mission in August 2000 to come up with a revised mitigation plan for the fragile ecosystem. The mission proposed an energy/environmental option that would attempt as much as possible to preserve the Kihansi Spray Toad and the rest of the ecosystem in the Kihansi Gorge while running the hydro power plant as planned. The proposed solution thus balanced international concern for the biodiversity of the area with a recognition of the importance of the power plant that would be supplying more than a quarter of Tanzania's power. Despite the contribution made by the environmental review mission, Bank supervision teams did not fully appreciate the urgency of preparing a mitigation plan and the high risks involved in any delays.

Bank supervision staff were particularly effective with donor coordination, and reflected the lesson learned in the SAR about ensuring mechanisms that would prevent the disruption of the project due to shortfalls in financing. For example, when the results of the sector restructuring study turned out to be unsatisfactory the Bank coordinated with donors to come up with funding for a study tour and a workshop to help the Government decide on restructuring and privatization options.

Given the complexity of the project, its status reports and aide memoires would have benefited from the logframe matrix which the Bank now uses in its appraisal and supervision work. Unfortunately, the logframe approach did not exist at the time of appraisal. This is especially true for the institutional development of Tanesco. Since the strategic choice was to improve management effectiveness from within, Tanesco received a strong injection of management tools, technical assistance and studies but there was no framework of inputs and outputs pulling it all together. Nevertheless, the project's SAR did provide detailed performance indicators to be monitored throughout the project though the project's supervision reports did not consistently monitor those indicators (See Annex 1). The supervision reports usually contained a table of objectives, with components and a descriptive comment on their status. The reports also noted some of the performance indicators mentioned in the SAR. In this regard, it should be noted that supervision teams had difficulty in reviewing the monitoring indicators in the SAR due to the fact that much of the data to be filled in was either unreliable or not available. One of the reasons for this was the delay in the implementation of the new management systems to monitor this information.

7.3 Overall Bank performance:

The overall rating of the Bank performance is unsatisfactory. While there are several positive aspects of the Bank's performance (see below) these are, on balance, offset by the following considerations: (i)

extensive delays in taking action, until late 2000, to redress a deteriorating financial, management, and institutional performance of TANESCO, including breaches of specific covenants; (ii) delays in the Bank following up on the lack of government action to ensure payments to TANESCO by other government entities as well as to reimburse TANESCO for social investments it was required to undertake; (iii) extreme tardiness in reporting the potentially adverse environmental consequences of the project for the Bank and the Borrower; and (iv) extensive delays in the development of an environmental mitigation plan which only narrowly averted the extinction of a species of toad unique to the Kihansi gorge.

At the same time, some of the positive contributions of the Bank during the project should also be noted: (i) the detailed preparation work for the project and the responsiveness of the project's design to the country's needs; (ii) the flexibility of the Bank in responding to the emergency drought situation in 1994; (iii) the high quality of the Bank technical input and the effective use of an independent Panel of Experts in providing advice on the unexpected rock stress problems that developed in the originally planned location of the underground powerhouse; (iv) the initiative shown by the Bank in August 2000 to send a team to recommend short term interventions to turn around the deteriorating operational and financial performance of Tanesco; and, finally, (v) the decision of the Bank to send a review mission to prepare an environmental management project to help finance urgent mitigation activities, once the downstream conservation concerns in the Kihansi gorge became apparent.

Borrower

7.4 Preparation:

The performance of the Borrower in the preparation work for the project was satisfactory. The technical components for the dam and the power plant were subject to rigorous study and evaluation. Tanesco's consultants prepared an inception report on the detailed design and cost estimates. Tanesco employed a Panel of Experts to obtain an independent review of the design. On the institutional side, the Government issued a policy statement on parastatal reform as part of its development strategy and established a Public Sector Reform Commission. Also, Tanesco began internal restructuring by decentralizing its billing operations and upgrading management in the seven distribution zones.

7.5 Government implementation performance:

As noted earlier in Section 5.2, the Government maintained its commitment to the restructuring and privatization objectives by completing a private sector restructuring study followed by a Cabinet decision that authorized the restructuring and privatization of Tanesco. However, during most of the project's implementation period, the Government did not fulfill important covenants designed to allow Tanesco to realize the financial benefits associated with institutional improvements under the project. Specifically, the Government did not take steps to ensure that Tanesco's finances would not be adversely affected by (i) the non-payment of electricity bills by government agencies and ZSFPC, and (ii) the implementation of rural electrification programs that were socially desirable but not economically viable. Given the lead time required to implement the structuring and privatization program, Government fulfillment of its commitments in these areas was critical not only to prepare Tanesco for privatization by increasing its value as a company, but also to ensure proper operation of the power system. Therefore the ICR rates the Government's overall implementation performance as unsatisfactory.

7.6 Implementing Agency:

Tanesco's implementation of the project's main components – the dam and power plant at

Kihansi was highly satisfactory. Its responsiveness to environmental concerns that developed during the project was also highly satisfactory. The implementation of the institutional components was on balance satisfactory; delays in the installation of the new accounting and billing systems were due more to the enormity of the task and shortcomings in the work of some consultants. Tanesco complied with most of its non-financial components and its non-compliance with financial covenants was due mainly to factors beyond the company's control. However, on the commercial side, Tanesco's performance was unsatisfactory due to serious management weaknesses, especially financial management, and its inability to follow-up effectively on important problems, such as theft in the prepayment metering system. Also, Tanesco operated at a loss during most of the project's implementation period.

The performance of the Ministry of Energy in the implementation of restructuring studies and preparation work for private sector gas development was **satisfactory**.

The performance of ZFSPC in the implementation of components for prepayment metering and commercial operations improvement was **satisfactory**. However, ZSFPC did not pay Tanesco regularly for electricity received throughout the project implementation period.

7.7 Overall Borrower performance:

Overall, the Government made some progress toward restructuring while Tanesco fulfilled most of the project covenants that did not depend on Government actions. However, the Government's unsatisfactory performance in demonstrating its commitment to Tanesco's commercial viability outweighed satisfactory progress elsewhere and was the major factor preventing Tanesco from benefitting from the project's institutional development components during the project implementation period. **As a result, the ICR has rated the Borrower's overall performance as unsatisfactory.**

8. Lessons Learned

Several important lessons emerged during the 8-year implementation period which are discussed below in three broad categories: **A. Technical; B. Institutional; and C. Environmental.**

A. Technical Lessons

1. Selection of Power Generation Sources. Given two generation options with nearly equal economic benefits, the operating experience of the implementing agency should be given considerable weight relative to other factors in deciding on the most viable generation option. During project preparation, both the gas option and the hydro option for generation had about the same projected economic rate of return. Within the Bank, the Project files indicated that opinion was divided about which option to choose. While a clear advantage of the gas option was reduced reliance on difficult and uncertain hydrology, it also would have been a new area of generation experience for Tanesco. More importantly, it would have required new contractual arrangements for gas development up front with private investors that, at the time, were not clearly forthcoming. With hindsight, the Bank was realistic in its approach, recognizing the critical timing for new generation capacity and supporting the preference of Tanesco for the hydro option, deferring the gas option, pending the restructuring of the power sector and clear commitments from private investors for the development of the gas. The record of project development supports this decision. As it turned out, while the preparation for the private gas development and electricity project began around the same time as the Bank approved the Power VI Project, it took about seven years before the Songo Songo Gas Development and Electricity Generation Project reached the stage of Board approval and the gas itself is scheduled to come onstream in 2005.

2. Use of Prepayment Metering. Prepayment metering can be an effective technical solution to power company billing and collection problems but configuration in line with the tariff structure and loopholes for fraud should be given priority attention in the design of the system. The pilot prepayment metering system tested in Tanzania was an innovation for utilities in Africa. The independent financial performance study outside the project has pointed out the success of the prepayment metering system and has prepared an initial financial analysis supporting the system's further expansion. However, it pointed out that configuration problems and fraud can detract significantly from the benefits. In the case of Tanesco, it is clear that despite the adverse impact of these problems during project implementation -- which ultimately were resolved -- Tanzania's difficult financial condition, especially in years of poor hydrology, would have been even worse without the system. Moreover, the system installed in Zanzibar incorporated the lessons learned in the mainland system and it was very successful.

B. Institutional Development and Privatization Lessons

1. Interim Management of a Public Utility Destined for Privatization. The form of institutional development assistance in a power project should depend on the individual country situation as well as a realistic assessment of what can be achieved during the project's implementation period. In evaluating the management of a public company destined for privatization, it is not reasonable to expect optimal performance given that the decision to privatize is an acknowledgement that the utility cannot operate effectively as a public utility subject to government influence. And while the technology and other institutional development support may be necessary conditions for commercial operation, they are not sufficient. Optimal commercial performance is likely to require a commercial culture that is difficult to develop while the company is in a transition status, still subject to some government intervention, and managed by technically competent engineers who see their main responsibility to ensure reliable electricity supply almost irrespective of cost. For this reason, for any institutional development support to be effective during a transition period to privatization it probably needs to be accompanied by new management recruited from outside.

2. Choice of Investment Loans for Privatization. In general, standard investment loans are not appropriate lending vehicles to pursue privatization objectives, especially the construction of a large hydropower plant. While the present investment loan had only 'partial privatization' as a goal and was flexible on the timing of privatization, there are inbuilt constraints in investment lending that make it difficult to monitor effectively progress towards a sector policy goal. For this consideration, privatization objectives should be normally pursued through adjustment lending supported by a TA loan.

3. Flexibility in the Timing of Privatization. Power VI was one of the first projects under the new Bank guidelines for power lending, emphasizing private sector development. Experience in a number of Bank projects shows that the Bank has been overly optimistic about the time required for restructuring and privatization. In contrast, the Power VI project was more realistic by not imposing a timeframe at appraisal but instead focusing on assistance to help the Government decide on a restructuring option and an implementation plan. Given that Tanzania was in transition from a socialist to a market economy and desperately needed the project to avoid the potentially disastrous impact of load shedding on the economy, it was not realistic to expect restructuring of the power sector before Board Approval. The experience in Tanzania and elsewhere in Africa is that privatization requires time as well as political and social buy-in if it is going to be successful. A flexible approach to privatization, where progress and commitment continue to be monitored, is therefore more likely to result in a successful outcome.

4. Importance of a Commercial Culture. Taking into account the country situation and the needs of the power sector, the choice of trying to improve Tanesco from within while working towards sector

restructuring was not an unreasonable one. However, the absence of a commercial management culture in Tanesco undermined the effectiveness of different management tools financed under the project. When the operational and financial performance of Tanesco reached a crisis in the final year of the project, the Bank intervened and recommended the recruitment of a new management team from outside Tanesco. Without some semblance also of a commercial culture in a utility, any operational management tools developed are unlikely to be beneficial.

C. Environmental Lessons

All hydropower projects with dams, by their very nature, are bound to have a deleterious impact on the environment in some way and assessments should reflect a consensus of Bank and Borrower policies on the amount of damage that is acceptable to meet human needs for electric power. However, given the possibility of unexpected impacts and changes in policy, ecological monitoring should continue during project implementation. Non-governmental organizations specializing in global environmental monitoring can play an important role in this process. Also it is important to make sure that the allocation of water rights takes place as early as possible in the project cycle and before a final decision to proceed is made.

1. Scope of Environmental Assessment (EA). The original EA, undertaken in 1991 prior to appraisal, was approved by regional management and subsequently by the Bank's board. Since that time the scope and rigor of EAs have evolved so there is little doubt that an EA carried out today for a similar type of dam construction (i.e. run-of-the-river scheme that includes a diversion dam with a small reservoir, resulting in virtually no resettlement, with a steep drop that generates large volumes of year-around spray) would have been undertaken with particular attention to downstream environmental impacts; these would need to have been evaluated prior to any decision to appraise. In the case of Power VI, the basic due diligence to assess the natural habitats was not undertaken until after Board approval when construction was already underway. The lack, therefore, of a more comprehensive EA before appraisal meant that key decisions affecting dam construction design, for example, on the size of the by pass flow-could not be taken as part of a comprehensive plan. This would have allowed appropriate weight to be given to environmental conservation concerns before construction started.

2. Multidisciplinary teams. In retrospect, the supervision of the Power VI project suffered from the lack of a Bank environmental specialist as a permanent member of the supervision team. While the decision to ask Norplan, a competent consulting group from a cofinancing country, to undertake the preparation of the EMP was reasonable, there was also a need for active engagement of Bank environmental staff in the early formulation of the EMP and especially once the Kihansi toad had been discovered in late 1996. While the Bank did respond in 2000 with financial assistance for mitigation activities, its initial response was slow and ran the risk of endangering further the ecosystem of the Kihansi gorge. A clear lesson is that a Bank environmental specialist should be an integral member of the supervision team for all Category A projects. At the same time, the budget environment in the Bank does not always encourage interdisciplinary teams. A related lesson, therefore, is that the Bank's internal environment needs to provide the requisite incentives-and resources- to encourage such teams, especially for Category A projects.

3. Adjudication of Water Rights. The failure to define water rights at an earlier stage of project construction, ideally before construction began, left unresolved the differing water requirements of energy generation for the dam and conservation requirements in the downstream area of the Kihansi gorge. This led to delays in finalizing the environmental mitigation plan, which in turn placed in jeopardy the effectiveness of this plan in preserving the ecosystem of the gorge. The presence of multidisciplinary Bank supervision team, working together to advise the government how to reconcile the energy/environmental

water requirements, might have facilitated an earlier definition of Tanesco's water rights. An important lesson is that water rights should be adjudicated at a much earlier stage and certainly prior to dam commissioning. This has not been the experience to date with hydro-schemes in Tanzania.

4. Importance of Environmental Monitoring. Despite the original assessment of minimal environmental impact, Power VI also took note of a lesson learned at appraisal that continued ecological monitoring during project implementation was important. Thus the project had a donor-funded environmental monitoring project throughout the course of its implementation and this monitoring work discovered that the drying of the Kihansi Gorge was a potential fire hazard and that there was a unique species of toad as well as some rare plant life dependent on the spray from the Kihansi Falls. Several non-governmental environmental organizations were instrumental in bringing the need to monitor the ecology of the gorge early in the project's implementation. Tanesco's environmental monitoring group responded to the concerns of these agencies and prepared further studies. The endangered nature of the species depending on the spray in the Kihansi Gorge was not confirmed until late 1998. However, by this time, Tanesco's environmental monitoring group already had begun mitigation programs and toward the end of the project, the Bank had ensured the sustainability of this work by financing an environmental management project that continues the monitoring and mitigation measures in the gorge.

9. Partner Comments

(a) Borrower/implementing agency:

The following are TANESCO comments on the report dated May 31, 2003:

1. Generally the report adequately addresses and covers achievements reached as far as project objectives and outputs are concerned.
2. Power system expansion planning, Demand Side Management and distribution system planning are mentioned in the passing. It was to be expected that more details would be given on their objectives and achievements.
3. On training it is noteworthy that although the tariff study was completed successfully, technology transfer to enable TANESCO to update the study was not satisfactory.
4. The report adequately addresses the issue of distribution system strengthening and rehabilitation. Indeed due to diversion of the funds the distribution system performance is still erratic and requires substantial investments today.

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(b) Cofinanciers:

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

10. Additional Information

10.1 When the initial Environmental Assessment was done for the Power VI Project, it was not possible to do a comprehensive exploration under the falls because of extremely rough and remote terrain. However, a decision was made that further work would be done under the project construction phase. The Environmental Assessment determined that there would be a very limited area covered by the reservoir and that there was no resettlement involved. It acknowledged however, that because of change in flow at the water fall there was likely to be a loss of some biodiversity.

10.2 During the construction, concerns arose about possible drying out of the gorge (water fall) and the potential for increase fires in the dry season. This concern triggered studies on ways of producing the spray which was caused by the water fall in its natural state, but using less water. The techniques included the use of high level nozzles, low level spray systems and a ski jump. The sprinkler system constructed as a result of these studies was later instrumental in preserving the Kihansi spray toad.

10.3 The continuing environmental research discovered a species of toad that had not been seen elsewhere. The studies were expanded and resulted in captive breeding of the toad, translocation and a search in similar gorges to determine whether the species existed there.

10.4 Supervision of the Project was shared and NORAD took the lead on the environmental matters.

Annex 1. Key Performance Indicators/Log Frame Matrix

(a) Selected Performance Indicators for TANESCO in the Staff Appraisal Report

	1990	1991	1992	1993	1994	1995	1996	1997	1998 (1)
Generation (GWh)									
Projected	1,629	1,739	1,937	2,066	2,191	2,316	2,441	2,570	2,686
Actual	---	---	---	---	1,720	1,795	1,942	1,878	2,196
Sales (Gwh)									
Projected	NA	1,425	1,553	1,663	1,777	1,901	2,041	2,186	2,337
Actual	1,304	1,614	1,443	1,453	1,482	1,631	1,829	1,701	1,718
No. of Connections (000)									
Projected	NA	181	187	193	199	205	211	217	223
Actual	175	---	---	---	---	---	---	---	373
No. of Employees (000)									
Projected	NA	6.4	7.5	7.0	6.0	5.5	5.0	5.5	5.5
Actual	6.7	---	---	---	---	---	---	---	7.1
Connections per employee									
Projected	26	28	25	27	33	37	42	43	41
Actual	---	---	---	---	---	---	---	---	52
Accounts Receivable (in days of sales)									
Projected	NA	133	144	108	60	60	60	60	60
Actual	213	255	---	---	---	---	111	102	78
Operating Ratio (%)									
Projected	NA	75	68	68	68	73	70	72	72
Actual	75	---	---	---	63	65	76	62	82
Debt Service Coverage									
Projected	NA	0.2	1.2	1.5	1.7	1.4	1.5	1.6	1.8
Actual	1.0	---	---	---	---	---	3.08	2.86	1.89

Source: Project files, Deloitte Touche Thomatsu, and PAD for the Songo Songo Gas Development Project.

Annex 1: Key Performance Indicators (Continued)

(b) Key Project Performance Indicators for Interim Review

Indicator	Actual Achievement
Increase of average tariff and its maintenance at levels stipulated in covenants	Tariff was increased to meet the long run marginal cost of supply (LRMC) and maintained at an acceptable level throughout the project.
Reduction of Accounts Receivables to equivalent of about 75 days of revenue	This was not achieved. Available information for accounts receivable-- expressed as number of days of revenue-- is as follows: 1997: 102 1998: 111 1999: 97 The achievement of the planned level was outside Tanesco's control because Government agencies and parastatal companies accounted for the majority of arrears and Tanesco was not allowed to disconnect them for non-payment.
Implementation of Agreed Staffing Proposals	
• -7,500 employees	Staffing at 7,124 in 1998 and 6,943 in 1999
• employee/customer ratio in line with similar utilities in the region	Customer to employee ratio found to be respectable, at 57 per employee, compared to an average of 43 for 12 countries in Africa, and the best performance of 69 per employee. (2)
• Freeze new appointments pending the result of staffing assessments	According to Project staff, this freeze took place as planned.
Offer of TANESCO's construction business for sale	According to project staff this was done sometime during the project but the actual date is uncertain.
Discussion of the findings and recommendations of consultants for restructuring	There was extensive review and discussion of the study and its findings were rejected. Instead the Bank and the Borrower agreed on a study tour of utilities that had study had experienced successful restructuring and privatization and a workshop to discuss the results and applicability to Tanzania's power sector. This took place in 1998 and led to the adoption by the Tanzanian Parliament, in October 1999, of a restructuring and privatization plan.

Sources: Staff Appraisal Report and Review of Tanesco's Financial Management, Final Report, Deloitte Touche Thomatsu, July 2000.

(2) Based on survey information for the following African countries: Angola, Botswana, Egypt, Kenya, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, and Zambia from the Deloitte Touche Study of July 2000.

Annex 1: Key Performance Indicators (Continued)

c) Implementation Program in Schedule 2 of the Development Credit Agreement

CATEGORY/ACTION	Planned Date	Actual Date
Project Management Establishment of a Project Management Unit	Undated	NA. The PMU was established.
Corporate Management Continue to fill positions of Managing Director and Deputy Managing Directors with qualified and experienced staff.	Undated	
Survey of salaries paid by other commercial organizations in Tanzania	Undated	Completed.
Establish a competitive compensation structure for all levels of employees based on the results of the survey	1/1/94	Established.
Appoint the following staff with qualifications and terms acceptable to IDA Planning Manager Systems Manager Management Training and Personnel Expert Director and Head Instructor for the Morogoro Training Institute Training Expert for the Kidatu Technical Training Institute Training Expert in Distribution Planning Productivity Improvement Expert	1/1/94	Completed.
Carry out a study of manpower requirements with the assistance of an externally recruited manpower expert	Undated	Completed.
Review the results of the manpower study with IDA	12/31/94	
Implement the manpower study's recommendations	12/30/95	Completed
Maintain a freeze on employment except for key vacancies or special needs.	Undated	Done (3)
Prepare a corporate management plan	1/1/94 and yearly thereafter	The files have only one corporate plan, for 1997.
Financial Carry out Asset Valuation Study	6/30/94	Completed in 1996.
Furnish recommendations of the Valuation Study to IDA and finalize recommendations taking IDA comments into account	Undated	
Implement the recommendations of the study within six months of the Asset Valuation Study's completion.	12/30/94	
Carry out the Tariff Study in Part H of the Project	6/30/94	Completed in 11/93 and updated in 1996.
Furnish results of the Tariff Study to IDA and take IDA's comments into account in the final recommendations	Undated	
Implement the recommendations of the Tariff Study within six months of its completion	12/30/94	Completed
Enforce a detailed plan of action for the recovery of overdue accounts from the Borrower's agencies and parastatal companies as well as the policy of disconnecting delinquent customers.	Undated	Done during toward the end of the project.
Prepare reports every three months, for IDA's review, on outstanding consumer accounts	Undated	
Reduce accounts receivable to less than 75 days of sales and maintain them at less than that level thereafter	12/31/94	Not achieved .
Environmental Implement and Environmental Mitigation Plan, satisfactory to IDA, for the Lower Kihansi Scheme and the transmission lines from Lower Kihansi to Iringa and from Lower Kihansi to Kidatu.	12/31/94	Completed in 09/96
Safety Ensure the continued safety of the Kihansi dam and associated structures and provide IDA with details of arrangements for inspection of dam and structures	1 year before dam construction at latest	Completed as planned.

Source: Staff Appraisal Report, Legal Agreements, and Supervision Mission Aide Memoires

(3) Freeze maintained and overall staffing decreased during the project period.

Annex 2. Project Costs and Financing

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

	Appraisal Estimate	Actual/Latest Estimate	Percentage of Appraisal
Project Cost By Component	US\$ million	US\$ million	
Tanesco Components			
Lower Kihansi	260.9	270.2	103.6
Distribution Improvement	50.1	15.0	29.9
Generation Rehabilitation	16.4	16.4	100.0
Equipment and Vehicles	7.5	5.0	66.7
Institutional Reform and Studies	25.7	24.3	94.6
Emergency Power Plant (EPP)	0.00	41.9	--
ZSFPC Component	2.0	2.5	125.0
MWEM Components			
Power Sector Study	1.0	0.5	50.0
Legal Services for Songo Songo	1.0	6.1	610
Gas Field Development	18.0	9.0	50
Technical Assistance	1.1	0.9	81.8
Total Project Costs	383.70	391.8	

Source: SAR, Project Files and Tanesco.

**Annex 2 - Summary of Procurement Arrangements
(US\$ million)**

	ICB	Other	NFB	Total
TANESCO Components				
Resettlement			2.2	2.2
Preparatory & Civil Works	99.9 (81.0)			99.9 (81.0)
Electromechanical Transmission & Substations Distribution Materials			92.7 41.3	92.7 41.3
Vehicles & Tools	50.1 (45.9)	0.6 (0.6)		50.1 (45.9)
MIS & System Control	1.8 (1.8)	0.4 (0.4)	1.9	2.4 (2.4)
Workshops	2.6 (2.6)		5.7	4.9 (3)
Demand Side Management	1.8 (1.6)	0.5 (0.4)		5.7 2.3 (2.0)
Generation Rehabilitation	15.3 (13.6)			15.3 (13.6)
Consulting services		33.2 (29.1)	7.6	40.8 (29.1)
Training		2.7 (2.7)	0.1	2.8 (2.7)
Property Software & equipment		0.3 (0.3)		0.3 (0.3)
ZSFPC Components				
Consultancy Services		0.8 (0.8)		0.8 (0.8)
Meters & assoc. Materials	1.2 (1.2)			1.2 (1.2)
MWEM Components				
Gasfield Equipment	16.6 (13.6)			16.6 (13.6)
Consultancy Services		3.3 (3.3)		3.3 (3.3)
Training		0.8 (0.8)		0.8 (0.8)
Office Materials	0.3 (0.3)			0.3 (0.3)
Total	189.6 (161.6)	42.6 (38.4)	151.5	383.7 (200.0)

- (a) Amounts in brackets are IDA financed
- (b) Consulting services, technical assistance, Limited International Bidding, direct procurement, and administrative overheads
- (c) Not financed by IDA

Procurement Arrangements (Actual/Latest Estimates) - \$USmillion equivalent

	ICB	NCB	Other	NBF	Total Cost
Works	138.40	0.00	0.00	159.56	297.96
	(130.20)	(0.00)	(0.00)	(0.00)	(130.20)
Goods	21.40	0.00	2.56	0.00	23.96
	(10.66)	(0.00)	(2.56)	(0.00)	(13.22)
Services	0.00	0.00	64.08	5.80	69.88
	(0.00)	(0.00)	(52.14)	(0.00)	(52.14)
Total	159.80	0.00	66.64	165.36	391.80
	(140.85)	(0.00)	(54.70)	(0.00)	(195.55)

Project Financing by Component - \$USmillion equivalent

FUNDING	Appraisal			Actual		
	IDA	Govt.	CoF.	IDA	Govt	CoF
Lower Kihansi	110.10	18.20	143.80	99.87	9.40	159.56
Distribution Improvement	45.90	4.20	0.00	9.04	5.96	0.00
Generation Rehabilitation	13.60	2.70	0.00	5.60	1.60	10.46
Equipment and Vehicles	5.90	0.00	1.90	5.00	0.00	0.00
Institutional Reform and Studies	8.00	4.10	5.80	15.84	2.66	5.8
Emergency Power Plant	0.00	0.00	0.00	41.93	0.00	0.00
ZSFPC Component	0.80	0.00	0.00	1.69	0.81	0.00
Power Sector Study	1.00	0.00	0.00	0.57	0.00	0.00
Legal Services for Songo Songo	0.00	0.00	0.00	6.11	0.00	0.00
Gas Field Development	13.60	3.00	0.00	9.00	0.00	0.00
Technical Assistance	1.10	0.00	0.00	0.90	0.00	0.00
Total	200.00	32.20	151.50	195.55	20.43	175.82

Source: SAR, Project Files, and Tanesco

Annex 3. Economic Costs and Benefits

Table 3.1 Recalculation of EIRR - cost and benefit flows

Year	Incremental Energy Sales (GWh)	Incremental Energy Benefits (Tsh, Million)	Reliability Benefits (Tsh, Million)	Investment Costs (Tsh, Million)	Incremental O&M and Consumer Costs (Tsh, Million)	Incremental Fuel Costs (Tsh, Million)	Total Costs (Tsh, Million)	Net Benefits (Tsh, Million)
1992	0	0	0	25,812	0	0	25,812	(25,812)
1993	0	0	0	28,514	0	0	28,514	(28,514)
1994	95	4,321	0	31,331	2,169	5,143	38,644	(34,322)
1995	196	15,596	0	27,899	2,101	5,602	35,602	(20,005)
1996	366	30,011	0	24,451	1,668	4,311	30,431	(420)
1997	260	38,786	0	11,635	1,749	10,479	23,863	14,923
1998	221	10,044	0	15,979	1,628	26	17,633	(7,589)
1999	314	14,271	0	22,408	3,434	1,697	27,539	(13,268)
2000	508	53,294	0	11,322	5,265	6,297	22,885	30,408
2001	709	32,224	0	11,338	5,880	1,278	18,497	13,727
2002	685	31,119	0	11,601	5,880	1,305	18,786	12,334
2003	685	31,119	0	503	5,880	2,319	8,703	22,417
2004	685	31,119	0	298	5,880	2,319	8,497	22,622
2005	685	31,119	0	138	5,880	2,319	8,338	22,781
2006	685	31,119	0	216	5,880	2,319	8,416	22,703
2007	685	31,119	0	0	5,880	2,319	8,200	22,919
2008	685	31,119	0	0	5,880	2,319	8,200	22,919
2009	685	31,119	0	0	5,880	2,319	8,200	22,919
2010	685	31,119	0	0	5,880	2,319	8,200	22,919
2011	685	31,119	0	0	5,880	2,319	8,200	22,920
2012	685	31,119	0	0	5,880	2,319	8,199	22,920
2013	685	31,119	0	7,961	5,880	2,318	16,160	14,959
2014	685	31,119	0	3,139	5,880	2,318	11,337	19,782
2015	685	31,119	0	0	5,880	2,318	8,198	22,921
2016	685	31,119	0	0	5,880	2,318	8,198	22,921
2017	685	31,119	0	1,133	5,880	2,318	9,331	21,788
2018	685	31,119	0	3,056	5,880	2,318	11,254	19,865
2019	685	31,119	0	1,422	5,880	2,318	9,620	21,499
2020	685	31,119	0	1,694	5,880	2,318	9,893	21,226
2021	685	31,119	0	159	5,880	2,318	8,358	22,762
2022	685	31,119	0	812	5,880	2,318	9,011	22,109
2023	685	31,119	0	2,159	5,880	2,318	10,358	20,762
2024	685	31,119	0	3,317	5,880	2,318	11,516	19,604
2025	685	31,119	0	3,102	5,880	2,318	11,300	19,819
2026	685	31,119	0	2,954	5,880	2,318	11,152	19,967
2027	685	31,119	0	2,954	5,880	2,318	11,152	19,967
2028	685	31,119	0	0	5,880	2,318	8,198	22,921
2029	685	31,119	0	0	5,880	2,318	8,198	22,921
2030	685	31,119	0	0	5,880	2,318	8,198	22,921
2031	685	31,119	0	(38,464)	5,880	2,318	(30,266)	61,385

NPV @ 12%: -14,010 Tsh million
 NPV @ 10%: 7,412 Tsh million
 EIRR= 10.60%

The EIRR of 10.6 percent is lower than the original estimate of 15 percent in the SAR due to several factors: (i) later commissioning of the Kihansi Plant than originally planned; (ii) lower energy sales than anticipated; (iii) the inclusion of environmental mitigation costs resulting from the discovery of an endangered ecosystem affected by the project; (iv) no reliability benefits because planned distribution investments were not undertaken; and (v) actual Kihansi output is lower than the design output because of the need to maintain a minimum by-pass flow of 2 m³/second (estimated requirement) due to the preservation of the endangered ecosystem.

Assumptions:

The economic analysis defines the component's benefits in terms of the incremental demand that is met under the "with the project" case relative to the much lower level of demand that could be served if no new supply capacity was added to the system. Since the project was an integral part of Tanesco's 1992-02 Investment Program, the economic analysis calculated the incremental demand and project costs relative to the demand and system costs in 1991, and not on the Kihansi Plant alone, in line with the SAR methodology.

The ICR valued the economic benefits at Tsh 45.5 per kWh (in 1992 prices), the average value in the SAR. The SAR based this value on two components: (i) the saving in resource cost from serving demand in the "without the project" case (kerosene lighting and private diesel generators); and (ii) the value of the incremental grid electricity demand served in the "with the project" case over the 1991 level of demand served in the "without the project" case. Incremental energy benefits, in the form of increased sales, increase through the 1990s as demand increases and reach a plateau in 2002 when the combined incremental capability of the investments has been reached. In 1995, 1996, 1997, and 2000, the analysis increased the value of the economic benefits to TSh 261 per kWh (US cents 90 per kWh in 1992 prices) for the portion of the demand that was met by Emergency (EPP) gas turbines because these reduced load shedding during periods of drought. Unlike the SAR, the ICR did not include reliability benefits as the project did not invest as much as expected in distribution rehabilitation. The ICR also did not include benefits from improved health, better education facilities, and other public services that the project contributed to in the project area.

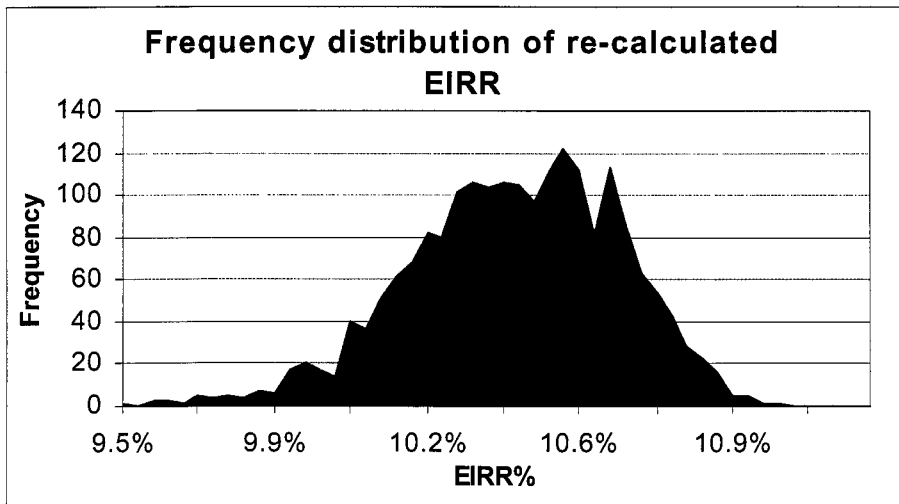
Project costs include: (i) power system investment costs during the period 1992-2002; (ii) costs of environmental mitigation in 2001-2006, about US\$6 million; and (iv) required reinvestments in EPP gas turbines and T&D network to sustain supply at 2002 level until the end of the evaluation period. Kihansi upgrade for future development (civil works for two additional generating plants that have not yet been installed) is deducted from investment cost (about US\$9 million of US\$206 million in 1992 prices) as per SAR. All costs are in 1992 prices without taxes. Crude oil price in 1992 US dollars: US\$22.7/bbl as per the Bank's forecast. Specific fuel consumption of GTs: 266 g/kWh; other older thermal plants: 288 g/kWh. Sales, investments, and O&M from TANESCO's audited accounts and statistics, except for 2001 and 2002, which are estimates. The analysis left the IPTL plant out of the calculation because it was not part of the least cost plan for system expansion. Its contribution to meeting the demand in 2002 was marginal but it will have a damaging impact on the viability of the sector.

Cases Considered at Appraisal and ICR Re-Estimate	EIRR %
Base Case	15.0
20 percent increase in investment Costs	12.8
Low Case Demand Forecast	12.9
One Year Delay in Lower Kihansi Plant Completion	14.5
One Year Delay in Lower Kihansi Plant Completion and 20 Percent Increase in Investment Costs	12.5
ICR Re-Estimate of the EIRR	10.6

Risk Analysis

To deal with the uncertainty in the level of future hydrological flows, and thus plant output, during the lifetime of project investments, the ICR simulated the operation of the power system from 2003 onwards using a "Monte Carlo" simulation process. The analysis used a simplistic system operation model, because historic hydrologic flow data was not available for the ICR. In this model, the hydro plants meet the base load demand, while thermal plants supply any deficit between generation requirement (sales plus losses) and hydro plant output. The analysis assumed that the annual output from the hydroplants varies from one year to another as a result of variations in the level of river flows. The analysis further assumed that the annual output from the "older" hydroplants, excluding Kihansi, varies between their minimum firm level (1,650 GWh/yr), the average (1,900 GWh/yr), and the maximum (2,150 GWh). For Kihansi, the analysis assumed that its output varies between the estimated minimum (670 GWh), average (800 GWh), and estimated maximum (930 GWh). The average is with a 2 m³/second by-pass flow, while the minimum is with an additional reduction of 2 m³/second flow available for power generation. The shape of the probability distributions is triangular. Finally, the analysis assigns a 0.9 correlation between the Kihansi output and the output of other hydro plants and a weak - 0.3 - correlation between the plants' outputs from one year to another to indicate possible cyclical variations.

Chart 3.1 Frequency distribution of the re-estimate of the EIRR



The above graph illustrates the distribution of the EIRR from the simulation. The expected EIRR is 10.4 percent. This is a little lower than the point estimate of 10.6 percent.

Annex 4. Bank Inputs

(a) Missions:

Stage of Project Cycle Month/Year	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating	
	Count	Specialty	Implementation Progress	Development Objective
Identification/Preparation				
July 1990	1	ENV		
October 1990	1	FA		
April 1991	2	EC, ENG		
May 1991	2	ENG, FA		
Appraisal/Negotiation				
June 1992	1	FA		
Supervision				
December 1994	1	ENG	S	HS
October 1995	2	ENG/ENV	S	HS
May 1996	1	ENG	S	S
March 1997	1	ENG	S	S
June 1997	1	FA	U	U
September 1997	2	ENG, FA	U	U
March 1998	2	ENG, FA	U	U
June 1998	2	ENG, FA	U	U
October 1998	2	ENG, FA	U	S
March 1999	2	ENG, FA	S	S
September 1999	2	ENG, FA	S	S
March 2000	3	ENG, FA, ENV	S	S
October 2000	2	ENG, FA(1)	S	S
ICR				

Source: Project Files and Bank Staff Estimates

* For most of the missions, project status reports were separate from the aide memoires that record the mission dates. In a number of cases, the mission dates were not necessarily coordinated with project status report dates and in those cases the ICR has used the date of the PSR rating closest to that of the mission.

(1) Joint Donor mission including representatives from Norway, Sweden, and the European Investment Bank.

Specialty Code:

EC = Economist

ENG = Engineer

ENV = Environmental Specialist

FA = Financial Analyst

ML = Mission Leader

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US\$ ('000)
Identification/Preparation	115.9	256.6
Appraisal/Negotiation	87.4	195.2
Supervision	168.25	581.8
ICR	6.7	23.2
Total	378.25	1056.8

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

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

	<i>Rating</i>				
	<input type="radio"/> <i>H</i>	<input type="radio"/> <i>SU</i>	<input type="radio"/> <i>M</i>	<input type="radio"/> <i>N</i>	<input checked="" type="radio"/> <i>NA</i>
<input type="checkbox"/> <i>Macro policies</i>	<input type="radio"/> <i>H</i>	<input type="radio"/> <i>SU</i>	<input type="radio"/> <i>M</i>	<input type="radio"/> <i>N</i>	<input checked="" type="radio"/> <i>NA</i>
<input type="checkbox"/> <i>Sector Policies</i>	<input type="radio"/> <i>H</i>	<input type="radio"/> <i>SU</i>	<input checked="" type="radio"/> <i>M</i>	<input type="radio"/> <i>N</i>	<input type="radio"/> <i>NA</i>
<input type="checkbox"/> <i>Physical</i>	<input checked="" type="radio"/> <i>H</i>	<input type="radio"/> <i>SU</i>	<input type="radio"/> <i>M</i>	<input type="radio"/> <i>N</i>	<input type="radio"/> <i>NA</i>
<input type="checkbox"/> <i>Financial</i>	<input type="radio"/> <i>H</i>	<input type="radio"/> <i>SU</i>	<input type="radio"/> <i>M</i>	<input checked="" type="radio"/> <i>N</i>	<input type="radio"/> <i>NA</i>
<input type="checkbox"/> <i>Institutional Development</i>	<input type="radio"/> <i>H</i>	<input type="radio"/> <i>SU</i>	<input checked="" type="radio"/> <i>M</i>	<input type="radio"/> <i>N</i>	<input type="radio"/> <i>NA</i>
<input type="checkbox"/> <i>Environmental</i>	<input type="radio"/> <i>H</i>	<input type="radio"/> <i>SU</i>	<input type="radio"/> <i>M</i>	<input type="radio"/> <i>N</i>	<input checked="" type="radio"/> <i>NA</i>
 <i>Social</i>					
<input type="checkbox"/> <i>Poverty Reduction</i>	<input type="radio"/> <i>H</i>	<input type="radio"/> <i>SU</i>	<input type="radio"/> <i>M</i>	<input type="radio"/> <i>N</i>	<input checked="" type="radio"/> <i>NA</i>
<input type="checkbox"/> <i>Gender</i>	<input type="radio"/> <i>H</i>	<input type="radio"/> <i>SU</i>	<input type="radio"/> <i>M</i>	<input type="radio"/> <i>N</i>	<input checked="" type="radio"/> <i>NA</i>
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> <i>H</i>	<input type="radio"/> <i>SU</i>	<input type="radio"/> <i>M</i>	<input type="radio"/> <i>N</i>	<input checked="" type="radio"/> <i>NA</i>
<input type="checkbox"/> <i>Private sector development</i>	<input type="radio"/> <i>H</i>	<input type="radio"/> <i>SU</i>	<input checked="" type="radio"/> <i>M</i>	<input type="radio"/> <i>N</i>	<input type="radio"/> <i>NA</i>
<input type="checkbox"/> <i>Public sector management</i>	<input type="radio"/> <i>H</i>	<input type="radio"/> <i>SU</i>	<input checked="" type="radio"/> <i>M</i>	<input type="radio"/> <i>N</i>	<input type="radio"/> <i>NA</i>
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> <i>H</i>	<input type="radio"/> <i>SU</i>	<input type="radio"/> <i>M</i>	<input type="radio"/> <i>N</i>	<input checked="" type="radio"/> <i>NA</i>

Annex 6. Ratings of Bank and Borrower Performance

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

6.1 Bank performance

- Lending
- Supervision
- Overall

Rating

- HS S U HU
- HS S U HU
- HS S U HU

6.2 Borrower performance

- Preparation
- Government implementation performance
- Implementation agency performance
- Overall

Rating

- HS S U HU
- HS S U HU
- HS S U HU
- HS S U HU

Annex 7. List of Supporting Documents

Relevant World Bank Appraisal Documents

1. Staff Appraisal Report, Tanzania: Power VI Project
2. Project Appraisal Document, Tanzania, Songo Songo Gas Development and Power Generation Project Report No. 21316-TA, August 21, 2001.
3. Project Appraisal Document, Tanzania Privatization Project.
4. Lower Kihansi Environmental Mitigation Project Document.

Selected Documents from Project Files (1990-97)

1. Bank mission to evaluate environmental studies for the Power VI Project, August 29, 1990.
2. Letter from the Ministry of Finance stating its preference for the Lower Kihansi project over the gas option, October 31, 1990.
3. Notes of the consultant ecologist on field trip to the Kihansi area, March, 1991.
4. Back to Office Report, Power VI Appraisal Mission. July 23, 1992.
5. Environmental Assessment for Power VI, June 15, 1992.
6. Panel of Experts, Review Report No.5, Review of the Main Civil Works Contract, September, 1994.
7. Response to Environmental Questions at Board Presentation, May 6, 1993.
8. Tanzania: Power VI Project (Cr. 2489-TA) Proposed Amendment to the Development Credit Agreement, April 19, 1995.
9. Acres International, Costs of Unsupplied Energy in Tanzania (Memo) February 1, 1995.
10. Letter from the World Bank to Tanzania's Secretary of Finance on Government Electricity Billing Arrears to Tanesco, August 16, 1994.
11. Contract for Legal Consultant Services in the Preparation of the Songo Songo Project , October 6, 1995.
12. Letter from Tanesco to Project Donors on Environmental Issues, October 23, 1995.
13. Letter from the Bank to the Managing Director of Tanesco, Responding to comments from non-governmental organizations on the environmental assessment, September 18, 1995.
14. Bank comments on the draft Power Sector Restructuring Study, January 19, 1996.
15. Comments of Legal Consultants for Songo Songo project on the draft Power Sector Restructuring Study, December 11, 1995.
16. Agreement between Tanesco and ESBI Consultants Ltd. On Institutional Strengthening Project Organization Study, February 14, 1997.
17. Review Panel Report No. 12, January, 1997.
18. Memo from the Country Director to the Regional Vice President: Notification of Intention to Suspend Disbursements and Potential Load Shedding, July 11, 1997.
19. Letter from the Country Director to the Minister of Finance (Tanzania): Notification of Intention to Suspend Disbursements, July 11, 1997.
20. Partner's Comments from Implementing Agency - Zanzibar State Fuel and Power Corporation

Relevant Documents Outside the Project

Lower Kihansi Hydropower Project (LKHP), Environmental Review in support of the National Environmental Council (Final Report), August 17, 2000.

Report of the Power Sector Performance Assessment Mission, August 20-September 1, 2000.

Project Aide Memoires

1. April 1, 1996
2. October 8, 1996
3. December, 20, 1996
4. October 6, 1997
5. March 20, 1998
6. July 2, 1998
7. March 25, 1999
8. October 7, 1999
9. October 4, 1999 (Zanzibar Component)
10. April 6, 2000
11. October, 2000 (Joint Donor Supervision Mission)

Tanesco Documents

- Quarterly Report No. 1, January to March, 1994
- Quarterly Report No. 2. April to June 1994.
- Quarterly Report No. 3, July to September 1994.
- Quarterly Report No. 4, October to December, 1994.
- Quarterly Report No. 5: January to March, 1995.
- Quarterly Report No. 6: April to June 1995.
- Quarterly Report No. 7: July to September, 1995.
- Quarterly Report No. 8: October to December, 1995.
- Quarterly Report No. 9: January to March, 1996.
- Quarterly Report No. 10: April to June, 1996.
- Quarterly Report No. 11, July to September 1996.
- Quarterly Report No. 12, October to December, 1996.
- Quarterly Report No. 13: January to March, 1997.
- Quarterly Report No. 14: April to June, 1997.
- Quarterly Report No. 15: July to September, 1997.
- Quarterly Report No. 16: October to December, 1997
- Quarterly Report No. 17: January to March, 1998.
- Quarterly Report No. 18: April to June, 1998.
- Quarterly Report No. 19: July to September, 1998.
- Quarterly Report No. 21: January to March, 1999.
- Quarterly Report No. 22: April to June, 1999.
- Quarterly Report No. 23: July to September, 1999.
- Quarterly Report No. 24: October to December 1999.
- Quarterly Report No. 27: July to September, 2000.
- Quarterly Report No. 28: October to December, 2000.

Norplan: Environmental Monitoring Reports

Baseline Public Health Assessment Study, February 1, 1994.

Quarterly Report No. 4 (1998) October-December 1997.

Quarterly Report No. 2 (1999) April-June , 1999.

Quarterly Report No. 1 (2000), January –March 2000.

Quarterly Report No. 2, (2000), April-June, 2000.

Quarterly Report No. 3 (2000), July-September, 2000.

Quarterly Report No. 4 (2000), October-December 2000.

Quarterly Report No.1 (2001), January –March 2001.

Selected Consultant Documents

Acres International, Power System Master Plan, Final Report, June 1999.

ESB and Price Waterhouse, Proposals for Power Sector Restructuring in Tanzania, Final Report, January, 1997.

KDA, Consultancy to Zanzibar State Fuel and Power Corporation, Final Report, February, 2000.

Worley International, Ltd., Upgrading of Customer Commercial Systems (IDA Cr. 2330-TA) Quarterly Report No. 6, October 1 –December 31, 1994.

London Economics, Ltd., and Kennedy and Donkin Power Ltd., and LE Energy, Electricity Tariff Study, Final Report, Volume 1, Executive Summary, November 1993.

ESBI Consultants, Ltd., Tanesco Corporate Plan (1997-2001), May, 1997.

Miscellaneous Reference Documents

World Commission on Dams, Dams and Development, Report of the World Commission on Dams, Earthscan Publications Ltd., London and Sterling, Virginia, November, 2000.

Additional Annex 8. BORROWER'S COMMENTS

BASIC PROJECT DATA

Country:	United Republic of Tanzania
Project Title:	Tanzania Power VI Project Zanzibar prepayment Metering Pilot Project
Loan Number:	Cr 2489-AT
Borrower:	Government of United Republic of Tanzania
Beneficiary:	The Government of Zanzibar
Implementing Agency:	Zanzibar State Fuel & Power Corporation ZSFPC
Loan Amount (at appraisal):	US\$2.00 million by International Development Association IDA
Project Completion Cost:	US\$2,456,899.84 financed by IDA
Date of Appraisal:	26th of February 1993
Date of Loan Signature:	26th of July 1993
Project Completion Date:	End of February 2000
Project Closing Date:	30th of July

INTRODUCTION

Zanzibar Prepayment Metering Pilot was a component of Power VI Project (Cr. 2489-AT), financed by International Development Association (IDA) as a creditor and Government of Tanzania as a Borrower. The total loan of \$200 Million was allocated to the Power VI Project, of which about \$2 Million from the total loan was allocated to the Zanzibar State Fuel and Power Corporation (ZSFPC) for Prepayment Metering Project. However, because of extension, about 2.487 million US\$ ended to have been used from IDA (World Bank).

The aim of the Project is to improve the ZSFPC financial capability so that it can manage to operate commercially without direct budgetary support from the Government.

The loan was intended for procurement of project material and consultancy services. Including a purchase of 10000 Prepayment meters and for the payment of Consultancy services. While ZSFPC was supposed to contribute the operational cost.

OBJECTIVE

The ZSFPC part of the Power VI project was intended to assist ZSFPC in strengthening its financial management capability. It comprise a component to bring the financial statement of the utility up-to-date, and upgrade its accounting system.

A second component of the project was to improve the collection by establishing a prepayment metering system for a part of the customers population in Unguja and to update the customer database for the rest of customers population.

Zanzibar Prepayment Metering Pilot Project was put into force with SFPC during 1998, the project implementation period was 2 years.

It was found vital that the prepayment meters was the solution to the existing problem of improving collection and also to recover its debts from their consumers while Consultancy was supposed to clear the database of billing system and make sure that all customers receive their bills at the same time to enable completion of financial accounting of ZSFPC at end of year ready for auditing. Also to propose and to put into process tariff increase and to put effort to the success of feasible option and to oversee the commercial operation.

Prepayment meter system is currency transfer system using credit transfer to the meter through an encrypted twenty-digit number printed on the paper token.

Prepayment meter is the most efficient method of revenue collection, due to non involvement of human especially in areas of meter reading, Billing, no disconnection program and less meter tempering. The consumer can use electricity by buying as he/she buys commodities from shop or supermarket.

The meter also used for debts collection, where by a customer paying off a proportion of his/hers debt for each purchase of electricity whereas easing burden of customer whilst recovering SFPC fund and maintain a positive customer relationship.

When the said tasks is completed, SFPC will be able to settle their old and current bills to TANESCO. While before the project SFPC it couldn't settle even portion of its bill to TANESCO.

IMPLEMENTATION COMPLETION

Five companies involved in the implementation of the project namely:-

- Joseph W. Sloan, Pre-Consultant
- Carl Bro International A/S of Tanzania
- Modern Computers Center O Zanzibar
- Kennedy and Donkin Africa (Pty) Ltd (Consultancy)
- Nor-Ici/EML Joint Venture (Contractor)

Pre-Consultant

Joseph W. Sloan of 1001 Willughby Way, Nashville, TN 37221, was awarded the contract at 14 May 1996 of evaluating of a Bid of consultancy and previewing its feasibility in about 2 weeks. Contract price was US\$21,250.00

Carl Bro International

Carl Bro International A/S of Tanzania, on 4th September 1997, was awarded a contract to cover consulting services for consultancy assistance to the ZSFPC to install, implement, and train in the use of a financial management information system based on Navision Financial package. The contract fee was US\$4,300.00

Modern Computer Center

Modern Computer Center of Zanzibar, on 27th October 1997, was awarded a contract to supply two computers and associated equipments to ZSFPC for the accounting section. The contract amount was US\$6,140.90

Consultant:

The Kennedy and Donkin, their service address is, Ground Floor, Dunkeld Crescent South, Albury Road, Dunkeld west Ext., Sandlon. P.O. Box 41927 Craig hall 2024, South Africa.

The Kennedy and Dokin on 18th December 1996, awarded a two year contract for consultancy services for Zanzibar Prepayment Metering Pilot Project. At the contract cost of US\$552,800.00 which was payable by the World Bank.

The contract has been extended two times covering eleven months input over to February 2000. The total cost of extension was 216,905.00 payable to the World Bank.

The project (the work of the service company) has been delayed to the extent that the Installation Phase Commence in the first quarter of 1999 at the time the consultancy services would expire. Therefore, the extension of Consultancy services was necessary to cover the installation period of the Prepayment meters, initial operating period and the preparation of the reports of Prepayment metering pilot Project. Here below are the Consultancy Services obligation.

- To review and set in process the matter of improving the performance of the Commercial department and customer accounting system of SFPC providing operating procedures, tidying up customer database and previewing the existed tariffs.

Where by during the contract period the survey of the customer of SFPC in billing information system which was in existence was done, and following which all customers were allocated to their position and a new tariff was introduced. The tariff that were in existence during 1993-1998 are displayed at the appendix 1. Where as the new proposed tariffs are displayed in the appendix 2 (These are the tariffs that are currently in use).

While the tariff of TANESCO, major supplier of electrical energy to SFPC has increased its bulk supply tariff to SFPC over the said period as shown in the appendix 3

- Had improved the performance of the Corporate Accounting system and enable the production of audited accounts for SFPC. Had delivered fully operational computerized accounting system which had contributed and enabling preparation of final accounts.
- Following the preparation and evaluation of the contract, the Nor-Icil/EML Joint Venture was selected. Had developed a pilot project for Prepayment metering. Had supervised the contractor for the supply, installation and subsequent operation of those meters and necessary system to support their operation and had supervised the contract through its operational phase. Where by the total number of 7780 customers were provided with prepayment meters, before the end of February 2000. The installation work had started 23rd of July 1999.

Main Contractor

The NOR-ICIL/EML Joint Venture the corporation incorporated under the South Africa laws and having its principal place of business at 14 Floor, York House, Empire way, Wembley, Middlesex, HA9 0PA England.

Nor-Icil/EML Joint Venture on 10th July 1998, awarded a contract of design, manufacture, test, deliver, installation, completed, and operate for a period of two years the prepayment metering and revenue collection system.

The contract price was in consideration of performance by the contractor of its obligation and was

in the aggregate of US\$1,574,919.88, US\$140,344.03 plus 4% of the project turnover. Out of the price, US\$1,420,194.37 was payable by the World Bank and the rest by ZSFPC.

During the implementation progress, due to the increase cost of materials it has been notice that the contract amount was not sufficient to complete the work satisfactorily. Therefore, the contract amount has been extended (increased) by US\$265,000 to a total of 1,685,194.30 payable to the World Bank. The scope of work include:

- Designing and modifications to the existing production meter
- Preparing the system software modification
- Carrying out full customer site survey
- Starting the public awareness campaigns
- Identifying, ordering and making delivery of installation materials
- Manufacturing and delivering of meters, and
- Ordering and delivering of the system hardware.

The installation work commenced on 23rd July 1999, which was also the commencement time of the operational period. The area that are covered by the prepayment meters in Zanzibar Town are – Michenzani, Kilimani, and Kikwajuni all through to Mazizini, Kiembesamaki, __weni, and Mombasa. At the final step the Stone Town was covered.

The number of meters installed per month were:-

Month	Number of meters
July 1999	716
August 1999	2403
September 1999	3038
October 1999	900
November 1999	545
December 1999	100
January 2000	74
February 2000	4
Total	7780

The installation work completed on early February 2000, whereas the operational period ended on 23rd of June 2001.

The project comprising the following major system

- One system Master Station and spare unit
- Four credit dispensing Units (CDU) and one spare unit
- 7700 single phase and 400 three phase meters
- 425 single phase and 40 three phase meters

At the project appraisal, it has been estimated to install about 10,000 prepayment meters. But due to increase cost of materials the figure of prepayment meters are down. During the operation period ZSFPC has manage to finance the procurement and installation of 1,200 prepayment meters from the fund collected by the project.

When the contract expired ZFPC renew the contract for one year at the cost of US\$235,314. The contract price including operational and installation of 1,200 another additional meters.

On the 23rd June 2002, ZSFPC will take over the project and operate itself. ZSFPC will continuously install new prepayment meters.

The payment allocation of IDA (World Bank) to Nor-Icil/EML joint venture, Pre Consultant, and the consultant with supply of computer and software are shown in Appendix 4.

The payment of operational cost, cost of meters and 4% of total revenue collection in US\$ obtained from Prepayment meters made by ZSFPC as part of its contribution to the project is shown in the Appendix 5.

CONCLUSION

As the aim of prepayment metering pilot project, was to improve the revenue collection. So that SFPC can be able to settle the old and current bill of TANESCO. The project has been successful, since the collection of SFPC has improved and the payment to TANESCO is now regularly done as shown in the Appendix 6.

The consumers seem to be interested in the prepayment meter system because the system has enabled the consumer to budget his/hers expenditure accordingly compared to conventional system.

On the other hand Prepayment meters has cut down the cost of operation to the executing agency. Since meter readers or Disconnecter are not used in prepayment metering as well as paper for printing monthly bill and disconnecting list. But, unfortunately the loan provided to SFPC turns out to be insufficient, to cover as many consumers as possible in the Islands.

Although Prepayment metering has improved the collection, there are some other shortcomings, such as tediousness in manual tariffs adjustment and lack of consumption statistics in kWh for all prepayment meters which result in the difficulties in corporate plans.

Appendix 1

The ZSFPC Electricity Selling Tariffs 1993-1998

Year	Block Price kWh	Tshgs/kWh (1)	Tshgs/KVA
1993	0-100	13	1,500
	100-300	29	

	>300	37	
1994	0-100	13	1,500
	100-300	29	
	>300	37	
1995	0-100	13	1,500
	100-300	29	
	>300	37	
1998	0-100	13	1,500
	100-300	29	
	>300	37	

Appendix 2

The ZSFPC Electricity Selling Tariffs 1999-2002

Year	Block Price kWh	Tshgs/kWh (1)	Tshgs/KVA
1999	0-100	25	3,000
	100-500	50	
	>500	72	
2000	0-100	26	3,250
	100-500	53	
	>500	76	
2001	0-100	28	3,500
	100-500	56	
	>500	81	
2002	0-100	28	3,500
	100-500	56	
	>500	81	

Appendix 3

Bulk Electricity Energy Selling Price (TANESCO to ZSFPC) in 1993-1998

Date	Tshgs/kWh	Tshgs/KVA	Average Tshgs/kWh
July 1993	5.70	1084	8.00
November 1995	10.00	1500	14.24
July 1998	17.00	1700	18.40
August 1998	21.50	3350	30.00

Appendix 4.

2489-AT Tanzania Power VI Project-Zanzibar Prepayment metering

All values in US\$.

<i>Description</i>	<i>Payment No</i>	<i>Contract Value</i>	<i>Paid Value</i>	<i>Balance</i>
Total loan Amount		2,000,000.00		
Prefeasibility. Joe Sloan Contract drawn up 14 May 1996		21,250.00		
Payment-approved 28 October 1996	1		7,050.00	
Payment approved 28 October 1997	2		7,299.04	
Total		21,250.00	14,349.00	6,900.60
Consultant Kennedy/Donkin contract drawn up 18 December 1996		552,800.00		
Payment Mobilization approved 7 February 1997	1		110,560.00	
Payment Production of Monthly Operating accounts approved 28 July 1997	2		55,280.00	
Payment Production of Commercial Department Procedures approved 1 December 1997	3		55,280.00	
Payment Issue Documentation to Bidders approved 29 December 1997	4		82,920.00	
Payment Month 16 approved 19 March 1998	5		55,280.00	
Payment Month 16 approved 20 July 1998	6		55,280.00	
Payment Month 24 approved July 1999	7		82,920.00	
Payment Month 20 received 4 August 1999	8		55,280.00	
Total		552,820.00	552,820.00	0.00
Consultants Kennedy & Donkin extension contract drawn up 23 December 1998		104,022.00		

Payment – 1st Half Extension – received 4 August 1999	9		62,413.00	
Payment – 2nd Half Extension – submitted 26 August 1999	10		35,422.00	
Total		104,022.00	97,835.37	
Consultants Kennedy & Donkin 2nd Extension contract drawn up 23 July 1999		112,883.00		
Payment 1st Half Extension submitted 4 August 1999			67,729.80	
Payment 2nd Half Extension submitted 14 February 2000				
Total		112,883.00	67,729.80	
Supply of Computers Modern Computer Center approved by World Bank 18/8/1997		6,140.96		
Payment Completion of work approved 3 March 1998	1		6,140.96	
Total		6,140.96	6,140.96	
Supply of Accounting Software and associated Training. Carl Bro Tanzania approved by World Bank 18 Aug 97		4,333.00		
Payment Completion of work 16 February 1999	1		4,333.00	
Total		4,333.00	4,333.00	
Supply, Installation and Operation of Prepayment Meters Nor-Icil/EML Contract signed 10 July 1998		1,420,194.00		
Nor-Icil/EML contract for additional finance signed 26 Nov 1999		265,000.00		
Nor-Icil/EML advance Payment approved by World Bank	1		141,988.06	
Nor-Icil/EML Progress Payment rec'd 4 August 1999 – Foreign Costs	2a		30,546.00	
Nor-Icil/EML Progress Payment rec'd 4 August 1999 – Local Costs	2b		5,410.00	
Nor-Icil/EML Progress Payment rec'd 4 August 1999 – Foreign Costs	3a		94,989.00	
Nor-Icil/EML Progress Payment rec'd 4 August 1999 – Local Costs	3b		2,720.75	

Nor-Icil/EML Progress Payment rec'd October 1999 – Foreign Costs	4a		261,958.49	
Nor-Icil/EML Progress Payment rec'd October 1999 – Local Costs	4b		8,305.89	
Nor-Icil/EML Progress Payment rec'd 8 November 1999 – Foreign Costs	5a		156,388.87	
Nor-Icil/EML Progress Payment rec'd 8 November 1999 – Local Costs	5b		11,402.33	
Total		1,685,194.37	713,711.31	26,826.13
Totals		2,486,623.33	2,456,899.84	33,726.73
Balance remaining of loan		27,540.10		33,726.73

Appendix 5

The payment made by SFPC to the Project as Cost of meters, bonus of 4% of the collection and operation cost fixed in US\$

1999	Cost of Meters	Bonus of 4%	Operation Cost fixed	Total
August		631.08	15,930.22	27,631.08
September		1,924.31	15,930.22	28,924.31
October		3,741.49	15,930.22	30,741.49
November		4,014.55	15,930.22	31,101.55
December	7,02.77	4,559.89	15,930.22	27,592.88
2000				
January	7,102.77	4,822.06	15,930.22	27,855.05
February	7,102.77	4,273.00	15,930.22	27,305.99
March	7,102.77	4,739.56	15,930.22	27,772.55
April	37,376.59	4,275.44	15,930.22	57,582.25
May	22,343.97	4,373.96	15,930.22	42,645.54
June	22,343.97	4,071.35	15,930.22	42,345.54
July	22,343.97	4,515.97	15,930.22	42,790.16
August	22,343.97	4,798.30	15,930.22	43,072.49
September	22,343.97	4,658.16	15,930.22	42,932.35
October	14,064.93	5,971.84	15,930.22	35,966.99
November	28,802.65	3,950.02	15,930.22	48,682.89
December	15,639.37	5,260.73	15,930.22	36,830.32
2001				
January	14,064.97	5,421.49	15,930.22	35,416.68
February	20,755.99	4,862.59	15,930.22	41,548.80
March	0	5,822.27	15,930.22	21,752.49
April	0	5,063.38	15,930.22	16,433.60
May	1,299.78	4,922.20	15,930.22	22,152.98
June	2,196.11	4,605.89	15,930.22	22,732.22
Total	256,204.99	101,419.23	366,395.06	726,215.39

Appendix 6

Payment from ZSFPC to TANESCO Since 1997 to 2001

1997	Tshgs
January	-
February	--
March	--
April	--
May	--
June	--
July	--
August	--
September	--
October	--
November	--
December	50,000,000.00
1998	
January	40,000,000.00
February	21,000,000.00
March	36,000,000.00
April	--
May	--
June	55,000,000.00
July	--
August	--
September	--
October	--
November	--
December	--
1999	--
January	--
February	--
March	--
April	--
May	--
June	--
July	--
August	--
September	--

October	--
November	15,000,000.00
December	35,000,000.00
2000	
January	--
February	20,000,000.00
March	20,000,000.00
April	20,000,000.00
May	20,000,000.00
June	100,000,000.00
July	100,000,000.00
August	100,000,000.00
September	100,000,000.00
October	100,000,000.00
November	100,000,000.00
December	100,000,000.00
2001	
January	100,000,000.00
February	100,000,000.00
March	100,000,000.00
April	100,000,000.00
May	100,000,000.00
June	100,000,000.00
July	100,000,000.00
August	100,000,000.00
September	120,000,000.00
October	150,000,000.00
November	150,000,000.00
December	150,000,000.00