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IMPLEMENTATION COMPLETION REPORT
(IDA-30190 PPF1-P9880)

ON A

CREDIT

IN THE AMOUNT OF US\$200 MILLION

TO THE

FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

FOR AN

ENERGY II PROJECT

June 29, 2006

Africa Energy Team
Infrastructure Family
Africa Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective)

Currency Unit = Ethiopian Birr

Birr 1 = US\$ 0.11289

US\$ 1 = Birr 8.89585

FISCAL YEAR

July 8 - July 7

ABBREVIATIONS AND ACRONYMS

CAS	Country Assistance Strategy
DCA	Development Credit Agreement
DC	Direct Contracting
EA	Environmental Assessment
EEA	Ethiopian Electricity Agency
EIB	European Investment Bank
EIRR	Economic Internal Rate of Return
EEPCo	Ethiopian Electric Power Corporation
EELPA	Ethiopian Electric Light and Power Authority
EMP	Environmental Management Plan
EMU	Environmental Monitoring Unit (EEPCo)
EREDPC	Ethiopian Rural Energy Development and Promotion Center
FIRR	Financial Internal Rate of Return
GCAP	Gilgel Gibe Archeological Project
GIS	Geographic Information System
GoE	Government of Ethiopia
GWh	Gigawatt hour
ICR	Implementation Completion Report
IDA	International Development Agency
ICB	International Competitive Bidding
ICS	Interconnected System
IDC	Interest During Construction
IS	International Shopping
kWh	kilowatt hour
MDP	Management Development Program
MIS	Management Information System
MW	Megawatt
MME	Ministry of Mines and Energy
MOA	Ministry of Agriculture
NBF	Not Bank Financed
NCB	National Competitive Bidding
NDF	Nordic Development Bank
NGO	Non-Governmental Organization
NPV	Net Present Worth
OP	Operational Policy
PAD	Project Appraisal Documents

PDO	Project Development Objectives
PAP	Project Affected People
REDP	Rural Energy Development Project
SCS	Self-contained system
WBISPP	Woody Biomass Inventory and Strategic Planning Project

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ETHIOPIA ENERGY II

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<i>Project ID:</i> P000736	<i>Project Name:</i> ET-Energy 2 (FY98)
<i>Team Leader:</i> Philippe Charles Benoit	<i>TL Unit:</i> AFTEG
<i>ICR Type:</i> Core ICR	<i>Report Date:</i> June 28, 2006

1. Project Data

Name: ET-Energy 2 (FY98) *L/C/TF Number:* IDA-30190; PPF1-P9880
Country/Department: ETHIOPIA *Region:* Africa Regional Office
Sector/subsector: Power (98%); Renewable energy (2%)
Theme: Infrastructure services for private sector development (P); Climate change (P); Rural services and infrastructure (P); Regulation and competition policy (P); Other financial and private sector development (P)

KEY DATES	<i>Original</i>	<i>Revised/Actual</i>
<i>PCD:</i> 04/09/1997	<i>Effective:</i> 05/06/1998	05/06/1998
<i>Appraisal:</i> 09/15/1997	<i>MTR:</i> 01/28/2002	
<i>Approval:</i> 12/11/1997	<i>Closing:</i> 01/31/2004	12/31/2005

Borrower/Implementing Agency: GOVT. OF ETHIOPIA/MME/EELPA/MOA
Other Partners: Nordic Development Fund, European Investment Bank

STAFF	Current	At Appraisal
<i>Vice President:</i>	Gobind Nankani	Callisto Madavo
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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: S
Sustainability: L
Institutional Development Impact: SU
Bank Performance: S
Borrower Performance: S

	QAG (if available)	ICR
<i>Quality at Entry:</i> S		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:

3.1.1 The project development objectives as stated in the Development Credit Agreement (Second Energy Project), dated January 25, 1998 (Project Appraisal Document dated November 13, 1997) were (a) to increase the efficiency and sustainability of Ethiopia's power sector, and to increase electricity use for economic growth and improved quality of life; and (b) to improve utilization efficiency of rural renewable energy. Progress on these objectives was measured by Ethiopia achieving by the end of 2002: (i) total system failures of no more than 3 per year; (ii) capacity to connect 250,000 new customers to the grid as the distribution network is rehabilitated and expanded (under a separate project); (iii) 100% of new industrial applicants for power connections will be satisfied; and (iv) to inventory biomass stock in Northern regions. Key Performance Indicators including actual/latest estimates are included in Annex 1.

3.1.2 The objectives and the design of the Project need to be assessed in the context of (i) low service cover and quality of electricity supply, (ii) needed efficiency improvements in the operation of EEPCo, and (iii) low efficiency in the use of biomass. Low access to electricity (about 5% at the time of Project Appraisal) and inadequate and poor quality supply demanded an urgent increase in generation capacity. In response, the construction of the 184 MW Gilgel Gibe Hydropower Power plant was included as the principal component of the Project. In addition, technical assistance was incorporated in the Project to improve EEPCo's day to day operations and in regulatory and institutional reform of the sector, as well as to improve the efficiency of biomass utilization by stock taking and promote the use of this basic renewable energy source.

3.1.3 The objectives reflected essential priorities for the power sector as well as rural sector development at that time, as identified both by the government and the Bank's Country Assistance Strategy. They were consistent with the Government of Ethiopia's (GoE) long term vision of the power sector and in line with GoE's policy of increasing the use of electricity for economic growth and improved quality of life, in commercializing EEPCo, in bringing tariffs up to commercial levels, of increasing private sector investment, and enhancing the utilization of biomass resources in formulating strategies towards meeting the biomass energy demand in rural area. It had clear links to the Bank's prevailing Country Assistance Strategy which aimed to reduce poverty by promoting sustained economic growth, and creating an environment conducive to rapid private sector and export development. The relevance of the Project's objectives is rated as high. They addressed the right priorities in the power sector at the time of appraisal and they remain relevant today.

3.1.4 A first step in the commercialization of EEPCo was taken at the time of Project Appraisal with the establishment of EELPA as a corporation by issuing a Regulation (no. 86/1997) under the Public Enterprises Proclamation No. 25/1992, with the expectation of reducing its burden on Government finances. At the same time, a tariff increase of about 39% was approved.

3.1.5 Any hydropower project is demanding on the Implementing Agency, and this project was no exception. The Project was reasonably complex, and carried a moderate risk rating. It faced a budget overrun, delays in implementation, and slow filling of the reservoir. Despite these not being uncommon features in other hydro plants, they impacted the financial feasibility of the Project. Additionally, tariffs have not increased (in nominal terms) for seven years, significantly reducing EEPCo's internal cash generation to support new investments. The Bank has in many opportunities, emphasized the importance of continued tariff increases to build a health and sustainable power sector, able to carry on investments of such magnitude. The deteriorating financial performance of EEPCo and the scale of the investment plan has the potential to jeopardize the sustainability of the Ethiopia's power sector. The tariff freeze and the

deteriorating financial situation has been responsible for its unsatisfactory PDO rating since December 2004. The institutional components also suffered some delays, but the financial impact on the overall Project is modest.

3.2 Revised Objective:

There was no formal revision of project objectives.

3.3 Original Components:

3.3.1 The Project, as stated in the Project Development Agreement, consisted of the following three components:

Part A: Gilgel Gibe Hydroelectric Plant (\$ 281.88 million, including about \$189 million in IDA financing), comprising: (a) construction of a hydroelectric power station, consisting on an underground power house with three 61.3 MW units on the Gilgel Gibe river, and rehabilitation and upgrading of associated power transmission lines and substations; (b) improving the efficiency and safety of EEPCo's power generation operations, through the acquisition of equipment, provision of technical advisory services and training for (i) the establishment and operation of a dam safety unit within EEPCo, (ii) the establishment of a maintenance systems for the Gilgel Gibe power plant and transmission system, and (iii) the establishment of a system to optimize the use of EEPCo's dam reservoirs; (c) acquisition of equipment and provision of technical advisory services for the implementation of (i) a plan for the resettlement of persons to be affected by the construction of Gilgel Gibe, and (ii) a plan designed to mitigate of the Project's potential adverse effect on the environment.

Part B: Rural Energy (US\$5.08 million, including about \$3.5 million in IDA financing), comprising (a) implementation of a program aimed at, inter alia, strengthening GoE's capacity in rural energy applied research, through acquisition of equipment, provision of technical advisory services and training, (b) carrying out an inventory of woody biomass resources in GoE's territory, through acquisition of equipment, provision of technical advisory services and training.

Part C: Institutional Development (US\$8.93 million, including about \$5.7 million in IDA financing), comprising (a) preparation of an appropriate legal and regulatory framework for the Borrower's Power Sector aimed at improving the efficiency of the sector and promoting private sector investment therein, including the carrying out of a tariff study and training; (b) implementation of a restructuring program designed to strengthen the administrative financial, accounting, technical and commercial capacities of EEPCo and to increase its autonomy and accountability, through the acquisition of computer hardware and software, technical advisory services and training; (c) updating of EEPCo's power expansion plans and improving its operations planning, through acquisition of equipment, and technical advisory services; (d) preparation and implementation of human resources development program for EEPCo; and (e) carrying out an evaluation of EEPCo's fixed assets, through provision of advisory services.

3.4 Revised Components:

3.4.1 An Emergency Recovery Project was included in June 2004 through an amendment to the DCA to provide US\$10 million for emergency equipment and materials for war-affected areas and in particular to replace stranded goods and equipment at Assab Port. This consisted of distribution and transmission materials, substation materials and equipment, as well as diesel generating sets of which the foreign cost was covered by the Credit.

3.5 Quality at Entry:

3.5.1 The Project's objectives were clearly defined and achievable at the time of appraisal and were consistent with the priorities for promoting sustained economic growth. The ICR has rated the quality at entry as moderately satisfactory on the basis of two issues: (a) slight disconnect between the key performance indicators and the development objectives; and (b) incomplete identification of all the risks elements of the Project. A brief discussion follows:

3.5.2 The Project was originally designed as a generation and distribution Project and the Key Performance Indicators (KPI) included those typical for a distribution expansion and rehabilitation project (i.e. total system failures; capacity to connect new customers including industrial customers). The Project costs were estimated at US\$405 million. However, subsequently it was decided to separate the Project components into two Projects, namely Project A and Project B (as per Aide Memoire dated November 28, 1996). Project A included the urgently needed capacity/energy from Gilgel Gibe, institutional development support, and a Biomass component. The main component of the second Project would be the distribution component which included system rehabilitation and expansion in urban areas. Project A then became the Energy II Project, with a total Project costs estimated at about US\$295 million equivalent) and Project B a Distribution Rehabilitation Project became the Energy Access Project which was only appraised in the 2nd quarter of 2002, about the time that Gilgel Gibe was to be commissioned. The KPI for the Energy-II Project retained those for a distribution project, which were outside its scope. However, it did include as well relevant KPI for a generation project (i.e. increase of reserve capacity and increase in installed capacity), which provides a mitigating factor in the assessment of quality at entry.

3.5.3 The problem of obtaining a technically sound least cost development plan based on a comprehensive and realistic load forecast and not just on projected rates of growth by various classes of customers, and taking into account the effect of tariffs, has been a recurrent problem since Project preparation. This problem has persisted and by Credit Closing EEPCo this matter is yet to be resolved. The risk of lack of agreement on an appropriate and realistic least cost investment program was not identified in the PAD. Furthermore, the Project also assigned a "low risk" to commissioning of Gilgel Gibe by mid-2002, and of "no risk" for increasing EEPCo's dependable capacity and firm generation by 2003. Both of these events did not materialize as anticipated. There were implementation delays, which, as already explained, is common for hydropower projects. Finally, the Project assigned a "Moderate" risk to subsequent tariff increases based on the fact that a tariff adjustment of 39% was made at the time of Appraisal and subsequent increases were expected. Delays in effecting tariff increases have been one of the root causes (the other being an unrealistic investment program) for EEPCo's weak financial performance. Tariffs remained frozen for 7 years, and were only increased in June 2006. The long term sustainability of the power sector depends on realistic, cost-reflective tariffs. As a consequence, the PDO at the time of Credit Closing was deemed unsatisfactory, but has been upgraded following action on tariffs and debt restructuring (see next section).

4. Achievement of Objective and Outputs

4.1 Outcome/achievement of objective:

4.1.1 The overall outcome of this Project is rated as moderately satisfactory. Although the project achieved its physical objective and most of its institutional objectives, the continuing weak financial performance of EEPCo has caused noncompliance with financial covenants with the result of an unsatisfactory PDO rating at Credit Closing. The recent tariff increase effective June 2006, as well as EEPCo's debt restructuring, have been an important initial step to improve EEPCo's financial performance, which led to an improvement in the PDO rating to moderately satisfactory.

4.1.2 Objective 1: Increase the efficiency and sustainability of Ethiopia's power sector, and to increase electricity use for economic growth and improved quality of life. The achievement of this objective and outputs is satisfactory, but there were delays in physical implementation and, notably, in effecting needed tariff increases. Output targets have been largely met. The construction of Gilgel Gibe I (3 x 61.3 MW) commissioned in April 2004, injected about 184 MW of dependable capacity and about 722 GWh (in 2005) to the interconnected system, improving reliability and quality of supply. It is in line with GoE Development Plan which emphasizes the development of hydropower resources, of which only 2% of an estimated hydropower potential of about 30,000 MW has been developed to date. In the last seven years, installed capacity reached 790 MW. In addition, since 1997, 2024 km (31% of total) was added to the transmission network and 12,650 km (55% of total) was added to the LV distribution network. The number of customers rose to 950,000, an increase of 45% over the 1997 level.

4.1.3 As EEPCo's generation system is predominantly hydro-based, it is still beset with shortages during the recent and previous droughts. Although reliability and quality of supply have increased, the distribution system is still beset by low voltage levels and voltage fluctuations beyond acceptable ranges. Much effort is being expended (including under the Energy Access Project) to improve reliability and quality of service.

4.1.4 During the past seven years, the number of electrified towns has increased by over 150 with the result that over 370,000 new customers (encompassing about 1.7 million new inhabitants) now have access to electricity.

4.1.5 On the capacity-building front, EEPCo's manpower development initiatives under the Project have been successful. The fact that management in EEPCo embraced change rather than resisting to it was the major factor for the impressive number of management development initiatives taken over the past years. After being reorganized as part of this Project, EEPCo has made extensive use of modern organizational change techniques including business process re-engineering, bench marking against international best practices, gap analysis, and extensive use of performance management systems. The most significant measure was a decentralization of operation and management, where the EEPCo was divided into eight regions with 10 to 15 districts in each region. Each district is responsible for the supply, maintenance and in dealing with commercial matters in its jurisdiction including new connections and revenue collection. As a result, the performance of the power sector in Ethiopia has become much better and the receivables as day's sales have been reduced from 105 in 1997 to 40 in 2005. Also the waiting time for new connections reduced from more than 90 days to about 14 days.

4.1.6 One of the important objectives of this project was the Legal and Regulatory Reform of the power sector. In line with the relevant outputs, the main achievements are: (i) establishing a legal framework for private participation; (ii) establishing of a Regulatory Agency; and (iii) legally establishing of commercial pricing principles of operators.

4.1.7 Environmental and social safeguards comply with the Bank's and national policies. In resettlement matters, this project was the first one in the history of Ethiopia to carry a constitutional resettlement under the New Constitution. It was acknowledged by the Parliament of Ethiopia (in 2001) to be a model for future resettlement. The Bank has also acknowledged (June 2001) the project as good practice. The project was also instrumental in strengthening the environmental unit at EEPCo, which has been converted into a permanent organization unit, thus guaranteeing that its work would continue in future projects.

4.1.8 Although the objectives of the Gilgel Gibe (the only physical component) have been fully achieved, this has to be counterbalanced by the impact to EEPCo and the sector of its deteriorating financial situation and in particular by: (i) delays in completion of a Tariff Study which would have allowed consideration by

Government at an earlier stage of a tariff adjustment which is a vital step to improving EEPCo's financial strength; (ii) delay in developing of an appropriate and realistic Least Cost Master Development Plan which would identified the best generation projects; and (iii) delays in the completion (past Credit Closing) of a Decentralized Billing and Accounting System. Delays in completing the Tariff Study put tariff increases on hold for almost seven years. Although the Tariff Study was completed in late 2006, it is unclear how EEPCo and the Government will apply its recommendations. Tariff increases were and continue to be an essential element to assure sustainability of the project and the financial equilibrium of EEPCo. A recent 22% flat tariff increase (lifeline rates exempted) has been applied (as of June 2006), but the issue of revenue requirements, tariff structure, and the regressive nature of existing lifeline rates have not been addressed. Subsequent tariff increases are necessary to maintain EEPCo's financial viability.

4.1.9 Objective 2: Improve utilization efficiency of rural renewable energy. The achievement of this objective and outputs is highly satisfactory. Output targets for both the demand side (carried out by MME) and supply side (carried out by MOA) for this technical assistance have been successfully achieved although more synergies could perhaps have been obtained if the activities on the demand and supply sides had been carried out by only one implementing agency. The institution development impact is high. On the supply side, the Woody Biomass Inventory and Strategic Planning Project (WBISPP) has developed strategic plans for the sustainable use and management of wood's biomass resources. On the demand side, the development of short-term objectives and strategies for meeting the biomass energy demand in rural areas. The major objectives consisted of reports and inventories on the following tasks: (i) fuel wood supply enhancement; (ii) improved rural wood stoves; (iii) charcoal production improvement and supply enhancement; (iv) review of market barriers and institutional framework. Those studies raised awareness and paved the road for future implementation efforts to improve biomass utilization efficiency both at supply and demand sides.

4.2 *Outputs by components:*

4.2.1 The outputs of the Project at Credit Closing are summarized by components and compared to the expected outputs and KPI set out at appraisal in the table below. Implementation ratings are also shown.

Project Components	Planned Outputs at Entry	Actual Outputs	Component Rating
A. Construction of 184MW Gilgel Gibe hydroelectric plant	<ul style="list-style-type: none"> ▪ Gilgel Gibe commissioned by mid 2002 with no cost overrun 	<ul style="list-style-type: none"> ▪ Gilgel Gibe commissioned in April 2004 and is operating satisfactorily, after a delay of about 21 months and cost overruns of 16% due mainly to unforeseen geological problems, tailrace tunnel collapse, embankment slide, etc. <ul style="list-style-type: none"> ● Effective implementation of sound resettlement program, considered a best practice 	S
B. Rural Energy (a) Wood biomass inventory (b) Assistance in establishing group to deal with rural energy.	<ul style="list-style-type: none"> ▪ Survey and Inventory completed by 2002 ▪ Rural group established and fully functioning by 2000. 	<ul style="list-style-type: none"> ▪ Survey and Inventory completed by 2002 ▪ Rural group established and fully functioning since 1999 	HS
C. Institutional Development (a) (i) Study tours for policy makers;	<ul style="list-style-type: none"> ▪ Study tours completed by June 1998. 	<ul style="list-style-type: none"> ▪ Study tours completed in 1998. 	

(ii) TA in implementing reform,	<ul style="list-style-type: none"> ▪ New Electricity Proclamation in place by end-1997 	<ul style="list-style-type: none"> ▪ Electricity Proclamation issued in July 1997 and electricity operation regulation in May 1999. 	S (on balance)
(b) (i) Tariff Study;	<ul style="list-style-type: none"> ▪ Tariff Study completed by April 30, 2001 	<ul style="list-style-type: none"> ▪ Tariff Study completed by December 2005, but no tariff increase or changes in tariff structure in the last 7 years 	
(ii) Training in regulatory and agency staff;	<ul style="list-style-type: none"> ▪ Training completed by end-1999 	<ul style="list-style-type: none"> ▪ Training completed by December 2005 	
(c) Restructuring and strengthening of EEPCO			
(i) assistance in corporatization and reorganization;	<ul style="list-style-type: none"> ▪ Utility incorporated as profit enterprise by end-1997 	<ul style="list-style-type: none"> ▪ Utility incorporated as profit enterprise in 1997 	
(ii) assistance for asset reevaluation;	<ul style="list-style-type: none"> ▪ Asset revalued by November 30, 1999 	<ul style="list-style-type: none"> ▪ Asset revalued in October 2001 	
(iii) assistance, training and IT for decentralizing billing and accounting;	<ul style="list-style-type: none"> ▪ Utility's commercial operations and accounting system decentralized by mid 2000 	<ul style="list-style-type: none"> ▪ Utility's commercial operations and accounting system decentralized since May 2006. 	
(iv) manpower development;	<ul style="list-style-type: none"> ▪ Training program in place 	<ul style="list-style-type: none"> ▪ Training program in place since 2003 	
(v) assistance in IT to improve operation planning,	<ul style="list-style-type: none"> ▪ Operations planning model installed and in use by mid-1999 	<ul style="list-style-type: none"> ▪ Operations planning model installed and in use since early 2000 	
(vi) system expansion study	<ul style="list-style-type: none"> ▪ Expansion study completed by August 31, 1999 	<ul style="list-style-type: none"> ▪ Comprehensive Master Plan completed by August 2005 followed by an Independent Review but requested update by EEPCo not available. Lack of agreements remains on an appropriate and realistic least cost development plan by Credit Closing. 	

Construction of 184 MW Gilgel Gibe hydroelectric plant (Component A)

4.2.2 This component is rated satisfactory. This component consumed about 95% of the total budget for the Project. It was in line with Government policy of increasing electricity use for economic growth and improved quality of life. It was part of EEPCo's least cost planting sequence utilizing plentiful hydropower resources and of meeting the rapidly growing demand. At the time of appraisal, the unit cost of firm energy from Gilgel Gibe was 6.7 ¢/kWh, including transmission upgrading, which compared with the cost of base-load thermal generation, using imported fuel and utilizing scarce foreign exchange, as being in the range 8-11 ¢/kWh. The economic justification for Gilgel Gibe was based on a sound economic assessment, taking into account incremental costs and benefits obtained from Gilgel Gibe that produced an EIRR of 11.7% when a discount rate of 10% was used. The average GDP growth rate was at the time of appraisal 7.5%.

4.2.3 The Project was delayed mostly by unforeseen events– which precluded a rating of “highly satisfactory.” Commissioning of Gilgel Gibe was supposed to take place by mid 2002; instead it was commissioned in April 2004. At the outset, there were some delays during the bidder's prequalification phase, slow mobilization of contractors, time to finalize the engineering drawings, and involvement of too many contractors making coordination more challenging. Unforeseen events included dam slides due to

heavy rains in 2001, illegal strikes, and border dispute. Procurement was carried out reasonably effectively, but with some delays in the issuing of no-objections. Cost overruns were due in part to unforeseen geological failures producing a collapse of the tailrace tunnel as well as access tunnel and switchyard. It should be noted that delays in implementation of large hydropower plants is not uncommon.

Environment and Resettlement Aspects of Gilgel Gibe

4.2.4. Gilgel Gibe was given a Category “A” Environmental Impact Classification due to some major environmental and social issues including, *inter alia*, the involuntary resettlement of 706 households (ca. 5,000 people); loss of 300 ha of riparian forest for wildlife and resulting biodiversity loss in the Oromia Region where the Project is located about 260km west of Addis Ababa; altered downstream flow of 16 km of the Gilgel Gibe river, and increased habitat for water-borne disease vectors. An EA, including and Environmental Management Plan, was carried out for Gilgel Gibe and completed in May 1997. The EMP included implementation and monitoring of environmental, health and safety measures. A buffer zone of about 4,000 ha was created to compensate for the loss of riparian habitat. This buffer zone is to be held free of cultivation or grazing and occupancy and enforced by local police under existing law. These measures appear to be adequate at present.

4.2.5 Resettlement, implemented in 1999-2000, was funded by the Federal Government. The 5,000 PAPs were resettled in nine resettlement sites. At the time it was deemed highly satisfactory as previously mentioned. The resettlement was completed two years ahead of impounding, 4 years ahead of completion of civil works. The total expropriation cost of immovable property was estimated at US\$8,611,000. The funds required were made available by the Federal Government of Ethiopia to the Oromia Regional Government before credit approval by the Bank. The resettlement cost was estimated at US\$4,600 per household, which is below the international average for a 180 MW hydropower plant. As part of the requirements for the completion of resettlement implementation, a socio-economic survey for post resettlement assessment of the affected people was completed in December 2005 to determine any needed follow-up activities.

4.2.6 Subsequent to the EA report, some cultural artifacts were discovered at over 20 sites. The lack of compliance with the Management of Cultural Property OP (OPN 11.03) was recognized during implementations and a systematic survey of the reservoir inundation and surrounding buffer zone was undertaken and completed prior to inundation in August 2002. The most significant sites were not inundated. An Archeological Findings Report was completed in December 2005 with the main goal of satisfying the requirement of a Cultural Heritage assessment of Gilgel Gibe.

4.2.7 The Archeological Findings Report provided a model that hopefully other governmental agencies will follow to preserve and protect Ethiopia’s rich cultural heritage. The goal of this report (referred to as the Gilgel Gibe Archeological Project (GCAP)), was to satisfy the requirement of the Cultural Heritage Assessment for Gilgel Gibe. Its fieldwork was undertaken in three phases, namely: (i) Phase 1 consisted of a systematic foot survey combined with shovel testing of all sites of potential significance; (ii) Phase 2 involved test excavations of those sites found to be of potential significance based on Phase 1 fieldwork, and (iii) Phase 3 involved major excavations of the most significant sites. Most of the archaeological sites found during the course of the field work were located in the upper slopes of the valley basin. Very few sites were found in the valley bottom, and justifiably, the inundation of the dam was considered to have a rather low impact on the archeological sites of the Gilgel Gibe valley. Of the 27 sites identified sites, only three merited Phase 2 excavations. Two of these were located in the main inundation zone, but were found to contain shallow and non-stratified deposits. The third site, located on a prominent hilltop within the environmental buffer zone, ended up being the only site that warranted Phase 3 excavations. The site was

found to be an elite cemetery dating to the 15th century AD, and surrounded by a stone monoliths in many instances decorated with bold symbolic designs. A total of nine human burials were exposed and ceramics, iron bangles and glass trade beads among the artifacts recovered.

4.2.8 As the report points out, the recognition of the need to include a cultural heritage management component in the project was very late in the implementation of the project, which created multiple logistical, financial, administrative and political problems. This needs to be avoided in future hydroelectric projects. The GCAP was the first archaeological project conducted in Southwestern Ethiopia, and hence virtually all its archaeological findings are deemed significant and first of its kind and hence unique. Copy of the Report is included in the project Files (Annex 7).

4.2.9 A Post-resettlement Assessment for Gilgel Gibe to assess the full impact of the social mitigation measures implemented was completed in December 2005. The report is available in the files (Annex 7). Among the 706 households displaced by the project, 562 households were resettled through a government assisted resettlement scheme and 144 households resettled on their own. For the post-resettlement assessment, a survey was carried out and the majority (i.e. 96.3%) of the resettled households responded.

4.2.10 As the construction of the dam disrupted the livelihood of the PAPs, as well as expropriated agricultural land, and demolished businesses and houses in the project area, the RAP, prepared in 1997, was implemented from 1999-2000. The PAPs resettled in nine sites located in Kersa and Omo Nada in the Jimma Zone, where the host community spoke the same language, practiced the same religion and were from the same cultural background. Each one of the PAPs was provided with financial compensation. Social infrastructure was provided at the resettlement sites, including access roads, several water wells and water points, rehabilitation of schools, health clinic, one veterinary clinic, four mosques, and one church.

4.2.11 The 562 households that were resettled through Government assistance were each provided with 2.5 hectares land for farming farm plot each. The total land size allocated for the resettled households is about 8,109 hectares of farmland. The resettlement Project Office has freely ploughed 2 hectares of land for each of the resettled households and it also supplied them with improved seeds and chemical fertilizer freely for the first year.

4.2.12 The main findings of the post-resettlement assessments include: (i) the resettlement program was indeed carried out according to the RAP in line with World Bank Guidelines; (ii) the quality of the new houses is superior to the old houses: the new houses were constructed with wood and mud and all have corrugated iron sheet roofing; (iii) both in the pre-resettlement sites and resettlement sites the largest portion of farmland was used to grow maize followed by teff and sorghum; (iv) walking distance to health centers as well as schools has been considerably reduced; (v) the average yield level for all types of crops has been reduced by 54%, (due to climatic factors) which has reduced the distribution of the crops for household consumption vis-à-vis for sale, (vi) the number of livestock owned by the resettled household has been reduced by 72%, and (vii) the social infrastructure such as schools, health clinics, and water points are in poor condition and in need of immediate maintenance. The reason given for the decrease in the number of livestock is a combination of disease (i.e. trypanomiosis) as well as reduced income which has forced the resettled households to sell their livestock to meet basic needs. The last two items would require follow-up monitoring of resettlement.

4.2.13 Without discounting the usefulness of the report, a critical reading would suggest that it lacks some consistency. Firstly, the role of the Project was to provide the needed infrastructure to improve the lives of the PAPs and local Government was clearly in charge of maintenance of schools, health clinics, roads, etc. Secondly, the production of teff and maize actually increased the first two years but declined

thereafter (climatic reasons). Thirdly, the reduction of agricultural yields and livestock also occurred in the community of origin as well as in the host community. In spite of those issues, all indications point to the fact that the PAPs are better off than now than prior to the resettlement effort.

Emergency Recovery Project.

4.2.14 The objectives of this additional component were achieved.

Rural Energy (Component B)

4.2.15 All outputs envisaged by this component have been satisfactorily achieved. It is ranked Highly Satisfactory. This component consisted of two subprojects: (i) Woody Biomass Inventory and Strategic Planning Project (WBISPP), completed in June 30, 2005; and (ii) Rural Energy Development Project (REDP), completed in January 2005.

4.2.16 Successful outputs of the WBISPP include: (i) producing ten separate strategic plans for the sustainable use and management of each region woody biomass resources; (ii) developing a comprehensive non-spatial (reports, tables and models) and spatial (GIS and remote sensing) database. The existence of the WBISPP is expected to have a very positive impact in the establishment of other related institutions, as well as for bridging information gaps particularly on natural resources that can be used by other institutions.

4.2.17 The four major tasks undertaken under the REDP comprise: (i) fuel wood supply enhancement; (ii) improved rural wood stoves; (iii) charcoal production improvement and supply enhancement; and (iv) review of market barriers and institutional framework. The major outputs consist of “study reports” in each of these major tasks which provide policy recommendations and set of strategies aimed at enhancing rural biomass energy supply and efficient use of biomass fuels. The main conclusion of this study is that under a “business as usual” scenario, the present standing stock of trees will only be able to meet, with environmental degradation, both the current demand plus the additional demand to compensate for the energy needs of an additional 20 million people in 2015. This will reduce the standing stock which would further aggravate the supply and demand balance in the regions. Low agricultural productivity will continue to be the root cause of further land clearing.

Institutional Development (Part C):

4.2.18 On balance, and despite the excessive and unwarranted delays in (i) reaching agreement on a realistic least cost investment plan as intended by the Power System Expansion Master Plan Study, (ii) completing the Tariff Study and, (iii) implementing the necessary tariff increases and revising the tariff structure, the achievement of the Institutional Development component is considered to be satisfactory due mainly to the achievements of the (i) Management Development Program (MDP), (ii) Study on Regulation Management, Sector Strategy, Electric Standards and Technical Regulation, (iii) Decentralization of Accounting and Billing, and (iv) Fixed Asset Reevaluation Study, as detailed below.

4.2.19 The Tariff Study was undertaken sequentially with the Assets Reevaluation Study and the Ethiopian Power System Expansion Master Plan Study. The two main objectives for this study were to develop a rate structure consistent with the Government objectives in social and economic development, and to ensure that EEPCo’s financial requirements are fully met so that it can operate on a financially sound basis as well as carry out prospective equitable and realistic development programs. The study was completed in December 2005, instead of April 30, 2001 as stated in the PAD. The considerable delay was

caused mainly by a change of load forecast due the consideration of a more ambitious plan of overall economic plan of the country as well as contractual disputes with the consultant. The objective of a timely completion of a useful Tariff Study has not been achieved, and its impact has yet to be revealed. Some issues such as tariff structure, lifeline rates, and revenue requirements to support the expansion program still have to be addressed by the power sector.

4.2.20 The Fixed Asset Reevaluation Study has been successfully completed and the results have been incorporated in EEPCo's financial statements since 2004. However, the software that was supplied as part of the Study cannot be used till the installation of the new accounting and billing system is in place and operational.

4.2.21 The Power System Expansion Master Plan Study aims were to (i) define the least-cost program for the development of Ethiopia's generation and transmission system for the next 25 years; (ii) provide the facility and capability to update the plan annually; and (iii) to update the plan by considering the changes occurring in the economy, the power market, and within EEPCo. The study produced a comprehensive master plan and subsequent revisions, taking into account various demand forecast scenarios and other changes since the issue of the previous master plan. It also upgraded in-house capability for developing and updating future master plans. The Master Plan Study, which was completed in 2006 by PB Power Consultants, has been revisited many times by EEPCo and the latest official version was not available by Credit Closing. EEPCo has not fully endorsed the study, raising issues about the assumptions used. EEPCo needs to finalize its official Master Plan. No agreement has been reached on a realistic least cost development path for the power sector, which properly takes into account the forecasted demand, financial resources limitations, and ownership structure. In the absence of an official Master Plan, and an articulated Government vision for the development of the power sector, the achievement of this activity is rated as unsatisfactory.

4.2.22 The Management Development Program (MDP) has been very successful; it provided EEPCo with both individual and institutional benefits. Fundamental changes were required within EEPCo to address the various deficiencies in management and management systems, as well as to introduce commercial principles for its day-to-day operations, decentralization of authority, implementation of performance-based management systems, commitment to best practices, and deregulation & privatization. On an individual basis, the MDP upgraded the skills and knowledge base of about 300 managers in technical know-how and on management systems and processes. Those managers have acquired alternative concepts of corporate culture and work ethics, enhanced their leadership skills, creative values and favorable attitudes to the emergence of entrepreneurship. The MDP also provided institutional benefits which have greatly contributed to the restructuring process now taking shape within EEPCo, including: (i) fundamental review of its corporate mission, vision and culture; (ii) review of core activities; (ii) consideration of its operation in a deregulated environment; (iii) consideration of privatizing some of its core and non-core activities/functions; (iv) consideration of outsourcing of a number of non-core activities; (v) implementing a system of performance management; (vii) moving to flatter, less hierarchical management structures; (viii) moving to decentralize operation giving each regional center a high degree of autonomy; and (ix) moving from being a monopoly to an effective and efficient public enterprise.

4.2.23 Study on Regulation Management, Sector Strategy, Electric Standards and Technical Regulation. The objectives of this study have been fully achieved, despite the effort not being translated into the development of a revised tariff structure. This activity was aimed at finalizing the government initiative to establish a regulatory body and to work out detailed regulatory instruments, institutional set up and human resource capacity development. This component consisted of three distinct activities which have been successfully carried out, namely: (i) defining regulatory instruments for economic and technical regulation;

(ii) procurement of vehicles and office equipment for the newly established regulatory Agency (i.e. Ethiopian Electricity Agency or EEA), and (iii) study tours for policy makers and capacity building of the newly recruited staff of EEA.

4.2.24 The consultancy service to define detailed regulatory instruments has been instrumental. Those instruments have included the specification of methodologies of utility regulation and draft directives both for economic and technical regulation. Implementation of these instruments compatible with the existing legal framework is completed and some instruments have already been put to use by EEA in day to day regulatory operation. These include electricity tariff regulation procedures and regulatory financial models, inspection guidelines, model guarantee agreement for bulk power procurement and demand side management guidelines. These are very important to better equip staff with techniques and tools to dispose of their duties. These have also been instrumental to raise awareness and concern of stakeholders on matters of regulatory issues.

4.2.25 The program has helped strengthen the institutional capacity of EEA to enable it to undertake specific activities in the realm of economic and technical regulation. As a result of this technical assistance, EEA will pursue its regulatory activity from a better position than was possible before and will dispose its mandates vested on it by the Parliament so that the power industry would excel in measures of service coverage, service quality and affordability. Despite the capability development of EEA, decisions on tariff structure and tariff level are still politically driven.

4.2.26 Decentralization of Accounting and Billing. Completed in May 2006, past Credit Closing, this technical assistance component is rated highly satisfactory as its objective is deemed to be fully achieved. Funded by the Nordic Development Fund (NDF), its main objective was to improve EEPCo's commercial operations by replacing the existing centralized Accounting and Billing Systems with decentralized and computerized systems.

4.2.27 This component suffered considerable delays caused mainly by rebidding as no qualified bids were received during the first tendering process, as well as late delivery due to problems with hardware and countrywide coverage.

4.2.28 Carried out in three phases, the last phase of implementation was started very late in September 2005, becoming operational for all regions in January 2006. The finalized Operation Acceptance Test for the Accounting and Billing Document was submitted to EEPCo on 26 April 2006.

4.2.29 Extensive training has been provided with 1145 of EEPCo's trained in billing and accounting systems as well as in Oracle and database administration and information and communication technology. In addition more than 1500 of EEPCo's employees have Basic Computer training. The introduction of modern Information and Communication Technology (ICT) system and tools are expected to strengthen EEPCo and boost its efficiency and advance EEPCo's effort towards restructuring, as it allows upgrading the capacity of regional offices in managing the system.

4.3 Net Present Value/Economic rate of return:

4.3.1 The PAD calculated an economic internal rate of return (EIRR) on the project's main component, that is, the construction of the Gilgel Gibe hydroelectric power plant. The basis for the EIRR for the power plant component was the evaluation of the difference between the incremental costs associated with the Gilgel Gibe power plants and the incremental benefits. The analysis points to US\$36.8 million of net present benefits discounted at 10% and a corresponding EIRR of 11.7% assuming 1997-2002 as the implementation period.

4.3.2 The ICR has re-estimated the EIRR at completion based on a similar methodology for the implementation period 1997-2004 and assuming a 50 year economic life. This resulted in a \$ 14 million of net present benefits and an EIRR of 11%. Doubling the willingness to pay from 6 US¢/kWh (i.e. average tariff) to 12 US¢/kWh produced an EIRR of 18%. Annex 3 provides details of the calculations for the ICR re-evaluation.

4.4 Financial rate of return:

4.4.1 EEPCo's financial position has weakened further due to its heavy capital investment program. The current ratio has dropped from 2.8 times in EFY1995 (GFY2202/03) to 1.5 in EFY1996 (GFY2004/05) and 1.1 in EFY1997 (GFY2004/05) and it is expected to decline further in the current fiscal year. EEPCo continues to be noncompliant with the financial covenants, namely: self-financing ratio of 25% and current ratio of no less than 2.0.

4.4.2 The financial rate of return (FIRR) was obtained on the basis of the following analysis (refer to Annex 9):

a) Ex-ante analysis, to validate the base case. This produced a FIRR of 10.5% wherein the returns to holders and shareholders are consistent with those in the PAD (in Annex 4-A):

b) Ex-post analysis, to evaluate the impact of additional investment costs due to the US\$ 60 million cost overrun (from US\$295 million to US\$355 million). The Project FIRR decreases from 10.5% to 8.6% and the return to shareholders decreases from about 50% to 1.4%.

c) Impact to Tariff Freeze in the last 7 years: at the current average tariff of 6.0 US cents/kWh, the return to shareholders falls to negative 2.2% and the Project FIRR falls to 5.6%.

4.5 Institutional development impact:

4.5.1 The Project's institutional development impact was substantial on balance. Strong evidence for this are: (i) a regulatory agency, EEA, has been established and strengthened; (ii) EEPCo's skills in management have been upgraded assisting the restructuring underway including the introduction of commercial principles; (iii) EEPCo's accounting and billing have been decentralized with country-wide coverage; (iv) EEPCo's planning capability has been upgraded to allow it to develop Master Plans; (v) a rural energy agency, EREDPC, has been established; (vi) enhanced capability for developing strategic plans for the sustainable use and management of woody biomass resources; (vii) Environmental Monitoring Unit (EMU) permanently established at EEPCo; (viii) first constitutional resettlement process carried out successfully and deemed good practice. Item (vii) regarding the EMU is particularly notable as the project itself led to the internalization and institutionalization within EEPCo of the need to conduct appropriate environmental and social impact assessments and to implement appropriate mitigation programs for investments in the electricity sector.

5. Major Factors Affecting Implementation and Outcome

5.1 Factors outside the control of government or implementing agency:

5.1.1 The main factor outside the control of government or implementing agency which might have eroded confidence was the destabilization of the economy caused by the outbreak of the border conflict between Ethiopia and Eritrea in May 1998 which lasted until June 2000 and created political tensions which interrupted the momentum of reforms. The border conflict exacted a heavy economic toll which strained public finances, reduced donor support and undermined investor confidence.

5.2 Factors generally subject to government control:

5.2.1 The two main factors which were subject to Government control were: (i) tariff structure and levels, and agreements on a realistic tariff adjustment for EEPCo and the power sector to achieve economic and financial equilibrium; and (ii) reaching agreement with EEPCo on a realistic least cost investment plan in support of the Government's economic and social development plans. The Government is well aware that tariffs were not adjusted for the last seven years, a situation which has impacted EEPCo's bottom line as well as its reform program. A recent tariff increase of 22% is a first important step to increase EEPCo's ability to support the development of the power sector in Ethiopia.

5.3 Factors generally subject to implementing agency control:

5.3.1 The two main and related factors under the implementing agency control were: (i) establishing a realistic least cost investment program; (ii) coming to terms with the realization that unrealistic investment programs will not serve EEPCo and Government well which is likely to lead to unsustainable tariff increases and/or unsustainable requirements for future government subsidies.

5.4 Costs and financing:

5.4.1 The estimated total cost at appraisal to be financed was US\$295.89 million equivalent. The latest estimate of the actual Project costs is \$355.79 million, resulting in a cost overrun of about 17%, which was covered by EEPCo's own resources. Cost overruns were due in part to unforeseen geological failures at Gilgel Gibe, producing a collapse of the tailrace tunnel as well as access tunnel and switchyard.

6. Sustainability

6.1 Rationale for sustainability rating:

6.1.1 The Project's sustainability is a point of concern taking into consideration the weak financial strength of EEPCo as well as an overly ambitious investment plan. However, follow-on projects will continue to press Government for a tariff adjustment and EEPCo for more realistic least cost generation plans.

6.1.2 On the positive side, generation from Gilgel Gibe has already exceeded the expectations set out at appraisal, and given EEPCo's solid practices with respect to operation and maintenance, the likelihood for these operational and maintenance practices continuing over the economic life of the Project is high. In addition, management skills have improved, sales are increasing, new connections are being made, there is a market for energy, and tariffs have recently been raised, which are expected to strengthen EEPCo's financial position, the main factor in the "unsatisfactory" PDO rating for the Project.

6.1.3 The Rural Energy component is already assisting the country in fostering the proper management of Biomass. The strategies developed under this component for natural grazing land and livestock feed resources as well as the creation of an agency to deal with Rural Energy has advanced the policy framework and has raised awareness and provided the supportive role for improved utilization of renewable energy with emphasis on biomass, which will foster its sustainable development in view of the expected high population growth in combination with low agricultural productivity of the Country which is expected to continue for the foreseeable future. However, the issue of deforestation is still of concern.

6.1.4 The establishment of a Regulatory Agency, the EEA, and its continuing skills building efforts have played a significant role in creating the capacity of the staff to assist EEA to meet the regulatory challenges with better professional competence. However, concerns remain about the regulatory independence on tariff structure and tariff adjustment issues.

6.2 Transition arrangement to regular operations:

6.2.1 Gilgel Gibe hand-over was undertaken seamlessly. Transitional arrangements to regular operations were put in place during the implementation and takeover of the hydropower plant. Staff from EEPCo was identified early during project implementation and given proper training locally or at the manufacturer's works for the various tasks required for operating and maintaining such an important hydropower plant. Some skilled staff was recruited for the management of the plant. Gilgel Gibe has been fully operational since April 2004. As EEPCo is well aware of the importance in supplying the growing demand for electricity and the need for continually improving reliability of supply and quality of service, it is to be expected that it has the commercial incentive to provide sufficient resources for an appropriate level of operation and maintenance.

6.2.2 The Project will continue to be monitored with the Performance indicators as describe in Annex 8.

7. Bank and Borrower Performance

Bank

7.1 Lending:

7.1.1 The Bank performance in lending was considered satisfactory. From the beginning, the Bank team was involved in a variety of power sector issues, including: (i) timely and urgent discussions on tariffs and tariff policy; (ii) establishment of a realistic least cost development plan; (iii) financing issues related mainly to EELPA's (which became later EEPCo) and financing strategy which at the time did not seem to be in line with Government's policy of a commercial operation with full cost recovery; (iv) on EELPA's assets revaluation; (v) decentralization of EELPA's billing system and accounting functions; (vi) proposals on automatic tariff adjustment mechanism; (vi) and on the apparent lack of authority in EELPA's line management as a result of the Board's intervention in day-to-day operational decisions, making a strong case for restructuring and commercialization rather urgent. The Bank team was also at the time trying to sort out whether to proceed with a Power Generation and Distribution Project, as was the original intention, or to go ahead with only a Power Generation Project and appropriate technical assistance due to its urgency, and to relegate the Distribution Project for a later project. Going ahead with a Power Generation Project (with the main component as the Gilgel Gibe hydropower plant) was agreed by the Prime Minister (in October 16, 1996).

7.2 Supervision:

7.2.1 The Bank's supervision performance was moderately satisfactory. It is noted that its QAG rating (2004) for supervision was unsatisfactory for inter alia "failure to detect earlier, and then alert Bank's management, of EEPCo's deteriorating financial position." The TTL at the time has explained that EEPCo's financial performance was satisfactory until 2003. In 2004 the Bank detected that the previous year's performance had not been satisfactory and that financial covenants had not been complied with. This information was conveyed to the Bank management, which had repeatedly prodded the Government on the issue of tariffs. Also, the Task Team was insisting on EEPCo's developing a realistic investment program, which should not have included the overambitious construction of Gojeb and Tekeze. In December 2004, the Task Team downgraded the PDO rating to "Unsatisfactory" due to lack of action to strengthen EEPCo's financial performance caused mainly by delays in effecting a tariff increase, which would affect the sustainability of the Project. The PDO remained "unsatisfactory" through the Closing Date but, as noted above, it was recently upgraded to moderately satisfactory following action on the tariff increase and debt restructuring, the result of lengthy dialogue between the Bank and the Ethiopian authorities.

7.2.2 The Project faced some challenges in terms of supervision. There were in fact four different TTLs in charge of the Project. These changes in management may have given rise to delays in implementation of

the institutional components, and slower progress on tariff issues and on the establishment of a realistic Master Plan. Despite those challenges, there is strong evidence of thorough and attentive supervision as regards the construction of Gilgel Gibe, which is in point of fact the main component of the Project consuming about 95% of the budget. The implementation of the Biomass component also received the necessary supervision. A total of 14 supervision missions were fielded, including the ICR mission.

7.2.3 According to the PAD, the MTR should have been carried 30 months after the effectiveness date, that is, by October 27, 2000. It was only carried out on January 28, 2002, almost 4 years after effectiveness. An earlier MTR could possibly have provided useful feedback on project implementation problems and helped facilitate the transition among the TTLs .

7.2.4 Rapport with main stakeholders during supervision, namely EEPCo, MME, MOA and other counterparts is deemed satisfactory.

7.3 Overall Bank performance:

7.3.1 On balance, combining the Quality of Entry and Supervision ratings, the Bank's overall performance is rated as moderately satisfactory.

Borrower

7.4 Preparation:

7.4.1 Both GoE and EEPCo were committed to the Project in view of the importance given to the commissioning of Gilgel Gibe for increasing service coverage and meeting the increasing demand utilizing the country's vast hydrological base and reduce poverty by promoting sustained economic growth. There was a close cooperation at the time of project preparation between the Government and the Bank, in Project definition and design. The performance of the Borrower during preparation is rated as satisfactory.

7.5 Government implementation performance:

7.5.1 The Government's performance during implementation is rated as unsatisfactory. The main issue was the delay in approving tariff adjustments. The failure of Ethiopian Authorities to proceed with tariff adjustments, which had not been taken place in the last 7 years, was detrimental to the financial situation of EEPCo and to power sector.

7.6 Implementing Agency:

7.6.1 EEPCo financial position has weakened further due to a heavy capital investment program. Due to a large investment as well as tariff issues, it has not complied with the financing covenant for 2 out of 6 years of the Project's implementation period, which has caused its financial performance to deteriorate decreasing the likelihood of the Project's sustainability. Overall system losses remain high at about 20% and hence efficiency has increased only marginally. Collection rates have traditionally been very high in Ethiopia (close to 95%), where a culture of payment prevails.

7.6.2 The managerial environment at EEPCo has changed to the positive and more in tune with a commercializing entity. As a result to EEPCo's commitment to fundamental changes within the organization to address the various deficiencies in management and corporate culture, there has been a marked improvement in EEPCo's management capability, in acquiring new skills and knowledge of its staff, as well as in refocusing of its mission and vision, which are essential if EEPCo is to succeed in its restructuring and commercialization efforts. Management of the physical construction of Gilgel Gibe as well as procurement are rated as satisfactory.

7.6.3 It carried out satisfactorily the implementation of the RAP as well as the required post-resettlement assessment, and archaeological survey.

7.6.4 On balance, however, the performance of the three Implementing Agencies, namely EEPCo, MOA and EEA is deemed as satisfactory.

7.7 Overall Borrower performance:

7.7.1 On balance the performance of Borrower is mixed but is rated as moderately satisfactory, primarily in view of the non-approval of a tariff adjustment and implementation of an unrealistic generation investment plan which is not supported by proper analysis. On the positive side, the Borrower demonstrated a satisfactory performance during Project preparation. Similarly, the performance of the Implementing Agencies, namely EEPCo, MOA and EEA was satisfactory throughout of the Project.

8. Lessons Learned

Vision Alignment

- It is important that the Government, the Implementing Agency and the World Bank share a common vision about the strategic direction of the power sector. This vision was not completely agreed upon at the outset, resulting in problems down the road. The most important manifestation of disagreement had to do with the establishment of a Least Cost Development Plan. The Bank has repeatedly expressed concerns about the overoptimistic demand growth assumptions (supply driven), about EEPCo's financial capability to implement large scale hydro projects, and on the inclusion of hydro plants which did not seem to result from a sound least cost planning process, such as Gojeb and Tekeze. As of today, there is a Master Plan prepared by a consulting company, but this plan has not been officially endorsed by EEPCo, resulting in an uncertain scenario as far as the supply and demand visions for the power sector are concerned.
- On a related issue, it is clear that Ethiopia is blessed with a low-cost, competitive hydro potential which can be harnessed to benefit the country and the region as a whole. However, the scale of those projects represents a substantial financial commitment and entails several types of risks (e.g. geological, market) for the incumbent utility, which may end up weakening the overall sustainability of the power sector. Therefore, the current business model of having solely the local utility as the implementing agency may not provide the necessary hydro capacity to meet Ethiopia and regional needs. Other types of institutional arrangements have to be examined, including the private sector and multi-country regional efforts.

Institutional

- The Bank and Borrower's commitment in establishing an environmental management unit was beneficial not only to the development of this Project, but to the organization as a whole. Environmental concerns have been institutionalized on a company-wide basis, as a result of the Project efforts. Currently EEPCo's has developed the organization structure, processes and practices to deal with environmental and social issues in an analytical and professional way.

Project Preparation and Supervision

- Continuity in task supervision is a very important factor in assuring a good project performance. Numerous changes in TTL management can produce a loss of continuity in terms of understanding and prioritizing key issues in the dialogue with the client. It is important to ensure a smooth transition between

TTLs, in particular at critical early stages of project preparation (and transitional arrangements need to be invoked and designed to overcome unforeseen events regarding staff availability). In this regard, a timely completion of a Mid-Term-Review could have helped facilitate this transition, by highlighting problematic areas and issues that needed urgent management attention, both to the task team and to the Implementing Agencies.

- PADs should be designed to allow for a more complete discussion of the risk of the impact of unforeseen events, which can delay project implementation, and result in cost overruns that adversely affect anticipated economic and financial results. Similarly, it is arguably more appropriate to judge projects not on whether they are able to achieve a specified EIRR and FIRR calculated in a base case (which is unlikely to occur), but whether the project exceeds targeted and minimum returns calculated using stress tests. This would provide potentially a sounder framework for analyzing whether unforeseen discrete events reduced the effective EIRR and FIRR to unacceptable levels -- arguably a more meaningful measure of success/failure than a comparison to a "base case" figure. This is particularly important for large scale, capital intensive large generation projects.
- The project legal agreements contained an array of financial covenants that were not well tailored to a utility that is looking to significantly increase access and expand its generation and transmission capacity. Given the experience with the Energy II project, the financial covenants under newly negotiated agreements for the power sector have been modified to focus on the critical issue of ensuring that the utility, as it expands, generates sufficient cash to meet its obligations, relying as necessary on grant and other financing to fund investments that exceed its financial capacity.

Resettlement, Social and Archeological Issues

- With proper planning and implementation, it is possible to develop strong resettlement efforts, even in countries with a modest track-record, as witnessed by the Gilgel Gibe Hydro Plant. Support from the Bank was essential to help the country accelerate the learning process.
- For Hydropower projects which are located in areas with the potential of uncovering objects with a rich cultural heritage, it is imperative to be very proactive during project preparation and undertake thorough field work of sites of potential significance to comply with the Bank's OP on the Management of Cultural Property;
- Handover arrangements with PAPs and other stakeholders for post resettlement monitoring and environmental management of the reservoir (i.e. workshop) is very important to (i) facilitate the transfer to the local and zonal administrations to better ensure the sustainability of the livelihood support system in place, and (ii) create awareness among stakeholders about the likely impacts of the project.

Biomass - Fuel Substitution

- The potential for introducing agricultural residue-based charcoal to supplement or displace the wood charcoal presently supplied and consumed in urban areas is significant but such investment would be financially viable only at large-scale operations.

9. Partner Comments

(a) Borrower/implementing agency:

EEPCo has commented that the Tariff Study and the Least Cost Master Plan have been satisfactorily delivered by the consultants by the Project's Closing Date and therefore both tasks have been formally accomplished. EEPCo has indicated that it intends to provide yearly updates of its Master Plan, which would be made available to the Bank.

(b) Cofinanciers:

NDF agrees with the content and findings of this ICR.

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

10. Additional Information

Annex 1. Key Performance Indicators/Log Frame Matrix

Project Development Objectives	In PAD	Actual/Latest Estimates
1. Improve the efficiency and sustainability of Ethiopia's power sector, and increase electricity use for economic growth and improved quality of life;	<ul style="list-style-type: none"> ▪ Capacity reserves of 10% in terms of firm energy and of 30% in terms of installed capacity. ▪ Total system failure of no more than 3 per year ▪ 100 % new industrial connections be met; ▪ Installed capacity increased by 184 MW at Gilgel Gibe with no cost overrun 	<ul style="list-style-type: none"> ▪ Achieved: in 2005, reserves were 39% of firm energy totaling about 2,836 GWh/year and 25% of installed capacity of 767 MW. ▪ Achieved – no failures were recorded as of Credit Closing. ▪ Achieved – 100 % of new industrial connections have been met in 2005. ▪ Achieved late, with cost overruns of 16% ▪ Effective implementation of sound resettlement plan
2. Improve the utilization of rural renewable energy	<ul style="list-style-type: none"> ▪ Complete inventory of biomass resources in Northern Ethiopia ▪ Help establish agency to deal with Rural Energy 	<ul style="list-style-type: none"> ▪ Achieved – the biomass inventory was successfully completed. In addition ten strategic plans and ten regional reports covering natural grazing land and livestock feed resources were completed. A comprehensive natural resources and socio-economic geographic information system and database were set up. ▪ Achieved - The EREDPC was established with proclamation no. 296/2002. The GoE was also established independent regional (rural) energy departments/units under the regional Water Mines and Energy Bureaus.

Project Outputs	In PAD	Status and Comments
1. Restructured power sector: a) Promote private sector participation; b) with correct pricing system; and c) Strengthened, commercialized EEPCO.	<p>By end of 1997, the following is in place:</p> <ul style="list-style-type: none"> • rules facilitating private participation in the power sector; • a regulatory agency (by end of 1997); • an adequate pricing system; • third party access to the grid; and • EEPCo converted into a for-profit corporation by end-of-1997 	<p>Government commitment in reforming the sector is demonstrated by the following measures:</p> <ul style="list-style-type: none"> • Partially achieved. Legal framework for the private participation established, including entrance procedures and investment incentives. Private operators in the isolated system are currently operating, despite expressed concerns about the need of a more coordinated approach to grid and off-grid electrification. • Achieved. The Regulatory Agency was established in 1997 • Partially achieved. Pricing approach for bulk supply legally defined. However, implementation of new tariff structure and tariff levels still pending, due to its significant political content. • Lack of clarity on access to grid has the potential to make some off-grid investments prematurely stranded. Private participation in large hydro projects has not yet materialized • Achieved – EEPCo was established in 1997 to take over management of the power system from the Ethiopian Light and Power Authority (EELPA).
2. Increased electricity generating capacity	<ul style="list-style-type: none"> • EEPCO's dependable capacity increased by 184MW at Gilgel Gibe 	<ul style="list-style-type: none"> • On balance achieved: EEPCO's dependable capacity increased by 184MW at Gilgel Gibe in April 2004 with

	by 2003 with no cost overrun, increasing Ethiopia's firm generation by 664 GWh per year	some cost overrun. In 2005 firm generation from Gilgel Gibe was 722 GWh per year.
3. Complete data on biomass resources in Northern Ethiopia	• Completion of resource Atlases and formulation of strategic plans for 6 regions	• Achieved – Ten regional strategic plans were produced.
4. Establish a capability to deal with Rural Energy	• Rural Energy Group established by June 30, 1999	• Achieved: Rural Energy Group established by June 30, 1999
5. Emergency Recovery Project	• This sub-component was included in June 2004 through an amendment to the DCA	• Achieved - US\$10 million for emergency equipment and materials for war-affected areas were included - in particular to replace stranded goods and equipment at Assab Port.

Annex 2. Project Costs and Financing

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

	Appraisal Estimate	Actual/Latest Estimate	Percentage of Appraisal
	US\$ million	US\$ million	%
Component			
1. Support of Power Sector Reform	8.93	22.12	248
2. Construction of Gilgel Gibe hydroelectric plant*	281.88	330.06	117
3. Improvement of Rural Energy Efficiency and Data Base	5.08	3.58	70
Total Project Costs**	295.89	355.76	120
Total Financing Required	295.89	355.76	120

* Includes Contingencies, Resettlement and Land Acquisition

** Includes new component: "Emergency Recovery Project".

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

Expenditure Category	Procurement Method ¹			N.B.F.	Total Cost
	ICB	NCB	Other ²		
1. Works	156302.36 (149040.04)	0.00 (0.00)	0.00 (0.00)	49341.86 (0.00)	205644.22 (149040.04)
2. Goods	4993.29 (4993.29)	737.25 (737.25)	1110.14 (1110.14)	571.99 (0.00)	7412.67 (6840.68)
3. Services	0.00 (0.00)	()	10738.74 (10738.74)	24311.84 (0.00)	35050.58 (10738.74)
4. Supply and Erect Equipment	47568.16 (33364.36)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	47568.16 (33364.36)
5. PPF Refinancing	0.00 (0.00)	0.00 (0.00)	0.61 (0.61)	0.00 (0.00)	0.61 (0.61)
6. Operating Costs	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	197.51 (0.00)	197.51 (0.00)
Total	208863.81 (187397.69)	737.25 (737.25)	11849.49 (11849.49)	74423.20 (0.00)	295873.75 (199984.43)

Project Costs by Procurement Arrangements (Appraisal Estimate) (US\$ million equivalent) (Without taxes and duties)

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

Expenditure Category	Procurement Method ¹			N.B.F.	Total Cost
	ICB	NCB	Other ²		
1. Works	179429.42 (149929.42)	0.00 (0.00)	0.00 (0.00)	86820.00 (0.00)	266249.42 (149929.42)
2. Goods	13771.38 (7591.38)	0.00 (0.00)	1182.10 (1182.10)	0.00 (0.00)	14953.48 (8773.48)
3. Services	0.00 (0.00)	0.00 (0.00)	9753.75 (5753.75)	12520.00 (0.00)	22273.75 (5753.75)
4. Supply and Erect Equipment	45819.33 (33209.33)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	45819.33 (33209.33)
5. PPF Refinancing	0.00 (0.00)	0.00 (0.00)	338.59 (338.59)	0.00 (0.00)	338.59 (338.59)
6. Operating Costs	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	6130.00 (0.00)	6130.00 (0.00)
Total	239020.13 (190730.13)	0.00 (0.00)	11274.44 (7274.44)	105470.00 (0.00)	355764.57 (198004.57)

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

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

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

Component	Appraisal Estimate			Actual/Latest Estimate			Percentage of Appraisal		
	IDA	Govt.	CoF.	Bank	Govt.	CoF.	IDA	Govt.	CoF.
1. Support of Power Sector Reform	4.08		4.85	5.71	6.13	10.28	140.0		212.0
2. Construction of Gilgel Gibe hydroelectric plant	191.74	48.03	42.11	188.72	99.23	42.11	98.4	206.6	100.0
3. Improvement of Rural Energy Efficiency and Data Base	4.18	0.90		3.47	0.11		83.0	12.2	
TOTAL	200.00	48.93	46.96	197.90	105.47	52.39	99.0	215.6	111.6

Annex 3. Economic Costs and Benefits

**ETHIOPIAN ELECTRIC POWER CORPORATION
GIGEL GIBE I HYDROELECTRIC PROJECT
ECONOMIC RATE OF RETURN
(Discount Rate: 10%)**

		Sales	Generation Inv. Cost	O & M cost	Total Cost	Annual Benefits	Net Benefits	PV of Benefits	PV of Costs	PV of Net Benefits
No.	Year	(GWh)	(MUS\$)	(MUS\$)	(MUS\$)	(MUS\$)	(MUS\$)	(MUS\$)	(MUS\$)	(MUS\$)
	1997		2.818		2.82			-	2.82	
	1998		4.020		4.02			-	3.65	
	1999		4.638		4.64			-	3.83	
	2000		22.032		22.03			-	16.55	
	2001		107.796		107.80			-	73.63	
	2002		103.717		103.72			-	64.40	
	2003		69.065		69.07			-	38.99	
	2004		0.124		0.124			-	0.06	
1	2005	740.08		1.57	1.571	44.40		20.72	0.73	19.98
2	2006	740.08		1.57	1.571	44.40		18.83	0.67	18.17
3	2007	740.08		1.57	1.571	44.40		17.12	0.61	16.51
4	2008	740.08		1.57	1.571	44.40		15.56	0.55	15.01
5	2009	740.08		1.57	1.571	44.40		14.15	0.50	13.65
6	2010	740.08		1.57	1.571	44.40		12.86	0.46	12.41
7	2011	740.08		1.57	1.571	44.40		11.69	0.41	11.28
8	2012	740.08		1.57	1.571	44.40		10.63	0.38	10.25
9	2013	740.08		1.57	1.571	44.40		9.66	0.34	9.32
10	2014	740.08		1.57	1.571	44.40		8.79	0.31	8.47
11	2015	740.08		1.57	1.571	44.40		7.99	0.28	7.70
12	2016	740.08		1.57	1.571	44.40		7.26	0.26	7.00
13	2017	740.08		1.57	1.571	44.40		6.60	0.23	6.37
14	2018	740.08		1.57	1.571	44.40		6.00	0.21	5.79
15	2019	740.08		1.57	1.571	44.40		5.45	0.19	5.26
16	2020	740.08		1.57	1.571	44.40		4.96	0.18	4.78
17	2021	740.08		1.57	1.571	44.40		4.51	0.16	4.35
18	2022	740.08		1.57	1.571	44.40		4.10	0.15	3.95
19	2023	740.08		1.57	1.571	44.40		3.73	0.13	3.59
20	2024	740.08		1.57	1.571	44.40		3.39	0.12	3.27
21	2025	740.08		1.57	1.571	44.40		3.08	0.11	2.97
22	2026	740.08		1.57	1.571	44.40		2.80	0.10	2.70
23	2027	740.08		1.57	1.571	44.40		2.54	0.09	2.45
24	2028	740.08		1.57	1.571	44.40		2.31	0.08	2.23
25	2029	740.08		1.57	1.571	44.40		2.10	0.07	2.03
26	2030	740.08		1.57	1.571	44.40		1.91	0.07	1.84
27	2031	740.08		1.57	1.571	44.40		1.74	0.06	1.68
28	2032	740.08		1.57	1.571	44.40		1.58	0.06	1.52
29	2033	740.08		1.57	1.571	44.40		1.44	0.05	1.39
30	2034	740.08		1.57	1.571	44.40		1.31	0.05	1.26
31	2035	740.08		1.57	1.571	44.40		1.19	0.04	1.15
32	2036	740.08		1.57	1.571	44.40		1.08	0.04	1.04
33	2037	740.08		1.57	1.571	44.40		0.98	0.03	0.95
34	2038	740.08		1.57	1.571	44.40		0.89	0.03	0.86
35	2039	740.08		1.57	1.571	44.40		0.81	0.03	0.78
36	2040	740.08		1.57	1.571	44.40		0.74	0.03	0.71
37	2041	740.08		1.57	1.571	44.40		0.67	0.02	0.65
38	2042	740.08		1.57	1.571	44.40		0.61	0.02	0.59
39	2043	740.08		1.57	1.571	44.40		0.55	0.02	0.53
40	2044	740.08		1.57	1.571	44.40		0.50	0.02	0.49
41	2045	740.08		1.57	1.571	44.40		0.46	0.02	0.44
42	2046	740.08		1.57	1.571	44.40		0.42	0.01	0.40
43	2047	740.08		1.57	1.571	44.40		0.38	0.01	0.36
44	2048	740.08		1.57	1.571	44.40		0.34	0.01	0.33
45	2049	740.08		1.57	1.571	44.40		0.31	0.01	0.30

Sensitivity to Willingness to pay increase: Doubling the Willingness to Pay to 12 US\$/MWh, produces an EIRR of 18%.

Assumptions: Cost of Electricity (Willingness to Pay): 6 US\$/MWh
Discount Rate: 10%
O&M cost: 0.5% of investment cost
Inflation rate: Not assumed
System Losses: ICS 19.95%
Capital cost is assumed to be actual expenditure
Economic Life: 50 years

Annex 4. Bank Inputs

(a) Missions:

Stage of Project Cycle	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating		
	Month/Year	Count	Specialty	Implementation Progress	Development Objective
Identification/Preparation					
12/12/1996	6	Team Leader (1) Energy Specialist (1) Financial Analyst (1) Operation Analyst (1) Economist (1) Operation Officer (1)			
Appraisal/Negotiation					
05/16/1997	6	Team Leader (1) Economist (1) Energy Specialist (1) Operation Analyst (1) Financial Specialist (1) Operation Officer (1)			
10/22/1997	2	Team Leader (1) Operations Officer (1)			
Supervision					
03/04/1999	3	Team Leader (1) Operations Officer (1) Economist (1)	S	S	
11/24/1999	4	Team Leader (1) Operations Officer (1) Economist (1) Energy Specialist (1)	S	S	
06/20/2000	5	Energy Specialist (1) Financial Analyst (1) Environmental Specialist (1) Operation Officer(1)	S	S	
10/10/2000	4	Team Leader (1) Resettlement Specialist (1) Operation Officer(1)	S	S	
12/28/2001	2	Team Leader (1) Biomass Specialist (1) Economist (1) Energy Specialist (1) Operation Officer(1)	S	S	
02/08/2002	5	Team Leader (1) Energy Specialist (1) Biomass Specialist (1) Financial Management Specialist (1)	S	S	
06/06/2002	4	Team Leader (1) Economist (1) Biomass Specialist (1) Operations Officer (1)	S	S	

	06/13/2003	3	Team Leader (1) Energy Specialist (1) Operations Officer (1)	S	S
	11/26/2003	4	Team Leader (1) Biomass Specialist (1) Energy Specialist (1) Operations Officer (1)	S	S
	04/16/2004	3	Team Leader (1) Power Economist (1) Operations Officer (1)	S	S
	12/15/2004	4	Team Leader (1) Financial Analyst (1) Resettlement Specialist (1) Operations Officer (1)	S	U
	03/08/2005	6	Team Leader (1) Biomass Specialist (1) Financial Management Specialist (1) Financial Analyst (1) Operations Officer (1) Resettlement Specialist (1)	S	U
	10/14/2005	6	Team Leader (1) Energy Specialist (2) Financial Management Specialist (1) Operations Officer (1)	S	U
ICR	03/02/2006	3	Task Manager (1) Operations Officer (1) Energy Specialist (1)	S	U

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US\$ ('000)
Identification/Preparation	58.6	224.1
Appraisal/Negotiation	134.1	470.2
Supervision	267.0	1,658.7
ICR	8.0	32.3
Total	467.7	2,385.3

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

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

	<u>Rating</u>				
<input type="checkbox"/> <i>Macro policies</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input type="checkbox"/> <i>Sector Policies</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Physical</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Financial</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input checked="" type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Institutional Development</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Environmental</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA

Social

<input type="checkbox"/> <i>Poverty Reduction</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Gender</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<i>Resettlement</i>					
<input type="checkbox"/> <i>Private sector development</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input checked="" type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Public sector management</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA

Annex 6. Ratings of Bank and Borrower Performance

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

6.1 Bank performance

Rating

- | | | | | |
|--------------------------------------|--------------------------|------------------------------------|-------------------------|--------------------------|
| <input type="checkbox"/> Lending | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Supervision | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Overall | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |

6.2 Borrower performance

Rating

- | | | | | |
|--|--------------------------|------------------------------------|------------------------------------|--------------------------|
| <input type="checkbox"/> Preparation | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Government implementation performance | <input type="radio"/> HS | <input type="radio"/> S | <input checked="" type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Implementation agency performance | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Overall | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |

Annex 7. List of Supporting Documents

1. Gilgel Gibe Hydroelectric Project Environmental Impact Assessment, Executive Summary, May 1997
2. Gilgel Gibe Hydroelectric Project, Environmental Assessment, Main Report, May July 1997
3. Project Appraisal Document, Energy II Project, November 13, 1997
4. Ethiopia – Country Assistance Strategy, Initiating Memorandum, April 2002.
5. Electricity Tariff Study, EEPCo, March 2003
6. Power System Expansion Master Plan Update, EEPCo, April 2004.
7. Ethiopia, Rural Energy Development Project; Final Rural Biomass Strategy Report, EREDPC, October 2004.
8. Ethiopia, A Strategy to Balance and Stimulate Growth, A Country Economic Memorandum, January 31, 2005.
9. Regulatory Study, Final Consultants Report, April 2005
10. Final Report on the Reservoir Component of the Gilgel Gibe Archaeological Project, Southwestern Ethiopia, 20 December 2005
11. Gilgel Gibe Post Resettlement Assessment Main Report and EEPCo’s Position and Comments on the Report of Gilgel Gibe Post Resettlement Assessment, January 2006
12. Decentralization of EEPCo’s Accounting and Billing Systems, Draft Final Implementation Report of April 2006.
13. Completion reports for the following components:
 - a. Executive Summary, EEPCo, March 2006
 - b. Gilgel Gibe, EEPCo, March 2006
 - c. Manpower Development Program, EEPCo, March 2006
 - d. Tariff Study, EEPCo, March 2006
 - e. Rural Energy Development – Demand Side – Ethiopian Rural Energy Development and Promotion Center (EREDPC) - March 2006
 - f. Rural Energy Development – Woody Biomass Inventory and Strategic Planning – Supply Side – MOA, January 2006
 - g. Legal and Regulatory Reform, EEA, January/March 2006
 - h. Power System Expansion Master Plan, EEPCO, March 2006
 - i. Decentralization of EEPCo’s Accounting and Billing Systems, May 2006.

Additional Annex 8. Performance Indicators to Monitor Future Operations

The following Performance Indicators to monitor EEPCo's future operation would provide a basis for ensuring effective project operation and the likelihood of Project's sustainability.

Monitoring Indicator	Base Values for Year 2005
T & D Losses (%)	ICS*: 19.95%; SCS** : 23.59%
New Connections	175,686
Energy Sales (GWh)	ICS: 2,033; SCS: 36
Employee Productivity (GWh/employee)	0.25
Available Reserve Margin (%) ***	Capacity: 39%; Energy: 20%

* Interconnected System

** Self-contained system

*** Available Reserve Margin = (Available Capacity or dependable capacity - Peak Load)/Peak load

Additional Annex 9. Details of Financial Rate of Return Evaluation

Financial Analysis Summary (US\$ million)

Ex-Ante Analysis

Rate of Return Analysis (*)	Costs	Return (Benefits)	Net Return	Rate of Return (Approximate)
Long Term Debt 234	164.9	141.8	-23.1	8.6%
Equity 19	13.8	45.4	31.6	32.9%
Adjusted (Plus 23.1)	13.8	68.5	54.7	49.6%
Total	178.7	187.2	8.5	10.5%

Ex-Post Analysis

Impact on Additional Investment Cost

Project Cost Increased from US\$295 MM to US\$ 355 MM = US\$60MM

a) Assuming same Cash Flow Stream of Benefits and Following Share of Additional Costs ... (US\$ Million)

Debt Holders	40.0
Equity	20.0

Rate of Return Analysis (*)	Costs	Return (Benefits)	Net Return	Rate of Return (Approximate)
Long Term Debt 234	164.9	141.8	-23.1	8.6%
Equity	13.8	45.4	31.6	32.9%
Adjusted (Plus Net Return 23.1)	13.8	68.5	54.7	49.6%
Additional Cost	60.0			
Project Total	238.7	187.2	-51.5	7.8%
To Debt Holders	274.0	193.1	-27.0	8.6%
Remaining to Shareholders	39.0	154.1	-132.9	1.4%

b) Assuming Additional Costs & Adjusted Benefit Cash Flow Stream due to Lower Tariffs = 6 US cents/kWh

To Debt Holders	274.0	193.1	-27.0	8.6%
Remaining to Shareholders	39.0	154.1	-33.5	-2.2%
Project Total	238.7	132.5	-106.2	5.6%

(*) From PAD - Sensitivity Analysis (Page 29) -NPV to equity holders falls to 0 if tariffs drop to 6 US\$ cents - Corresponding to loss in Benefit Stream of US\$54.7 Million

Additional Annex 10. Borrower's Implementation Completion Report

Energy II Project Implementation Completion Report

Executive Summary March 2006

1. Introduction

The Ethiopian Government has entered a loan agreement with the World Bank (IDA) for the financing of Energy II Project in January 25, 1998. The total credit amount was SDR 121,000,000. As part of this project the EIB and NDF have also entered agreement for co financing the project in January 25, 1998 and amounting \$ 42,000,000 and \$4,850,000 respectively.

All components which were agreed to implement during appraisal were successfully completed as per the latest scheduled date, end of December 2005, except the NDF portion; this component is also planned to complete on March 31, 2006.

Associated to the completion of the Energy II project, the borrower is supposed to prepare an implementation completion report (ICR). The ICR has two main parts: Executive summary, presented below, and detail report for respective components organized in a separate document.

2. Program Description

2.1 Project Development Objective

The project was designed with the aim of achieving the following objectives:

- 1) To increase the efficiency and sustainability of Ethiopia's power sector ; and
- 2) To improve utilization efficiency of rural renewable energy.

2.2 Benefits of the Project

The benefit to gain from the project includes:

- 1) relieving financial burden on the treasury;
- 2) upgrading generation capacity and number of consumers; and
- 3) Reducing degradation of rural ecosystem

2.3 Description of the Project

The project comprises the following components:

- 1) Gilgel Gibe Hydroelectric plant;

- 2) Manpower Development;
- 3) Tariff Study;
- 4) Power System Expansion Master Plan;
- 5) Fixed Asset Revaluation;
- 6) Decentralization of EEPCo' Billing and Accounting System;
- 7) Development of Rural Energy Capability;
- 8) Completion of Woody Biomass inventory in North of the country;

The following section dwells briefly on describing the tasks being achieved for respective components.

2.3.1 Gilgel Gibe Hydro Electric Plant

The generation capacity of the plant is 184 MW; its firm and average generation capacity is 640GWH and 770GWH per year respectively.

The construction of the plant took place under the following major components:

- Rock fill dam with bituminous upstream facing, a crest length of 1704m and a maximum height of 41m with a total storage capacity of 91 million meter cube;
- Tower type power intake of a design flow 160m³/s;
- Concrete lined power tunnel of 9,142m long and 5.5m finished diameter
- Under ground power house 103m long and 24.4m wide.

Construction of the plant being carried out with the help of nine contract packages and gets completed, and became operational, since February 2005.

As part of the component, the resettlement program was successfully completed; this made possible the resettlement of 756 house holds with better environment and supported by extensive development infrastructures.

2.3.2 Institutional Development

As part of a program to reform Ethiopia's power sector with the objective of long term sustainability and economic efficiency of electricity supply and relieving the financial burden, components (discussed below) were designed with the aim of addressing the legal and regulatory reform on one hand and restructuring of EEPCo on the other hand.

I. Legal and Regulatory Reform

The program promotes in placing new electricity proclamation which lays ground for private participation in the power sector and establishment of a regulatory authority. The main tasks in achieving this program includes: study tour for policy makers, technical assistance in the design of new sector structure and the corresponding legal and regulatory systems, training for the regulatory agency's staff, supply of information technology equipments and services and expert assistance during an initial period. All these activities were completed.

II. Restructuring of EEPCo

In support of the restructuring program of EEPCo, towards favoring commercialization and decentralization, the following components were initiated:

a) Manpower Development

The component was designed with an aim of upgrading the skill, knowledge, and attitude of senior, middle and front line managers. During the time of implementation, the original objective was later adapted to respond the requirements of the national reform agenda, targeted mainly at improving the performance of the Civil Service at all level.

The implementation phase was undertaken initially by identifying deficiency of management capability through conducting training need assessment (TNA). The findings of the TNA established the base to carryout a comprehensive training program allowing the participation of over 350 managers at senior, middle and lower level. Training courses mainly focused on general management, specialized functional training and counterpart training helping for upgrading in built capacity. The training program gets completed, which also marks the completion of the component, in March 2005 as scheduled.

b) Decentralization of Accounting and Billing System

In recognition for long time taking for accounts closing at the end of the year and bill preparation, agreement reached by the time to initiate this component geared towards adapting both accounting and billing systems that would improve efficiency. Implementation of the systems did require selection of a comprehensive both accounting and billing soft ware, arrangement of hard ware and extensive training.

Presently, the implementation is at the final stage; accounting decentralization gets completed in all regions including the head office. Billing decentralization also became operational in Addis Ababa region which includes five district offices and thirty one service centers, beyond the original scope shown on PAD. The remaining few tasks planned to complete on the scheduled date, end of March 2006. The nature of the component prompted to undertake intensive training; above 1000 staffs of EEPCo get trained.

c) Tariff Study

In support of the reform program, the component was initiated with the aim of improving the financial position of EEPCo. In line to this as a first step contract signed with the consultant to carry out the study on April 2004; it was planned to complete in 66 weeks time. Delay of power system expansion master plan, major input for Tariff study, prevented from keeping the schedule; the situation forced to enter contract amendment, signed on 28 November 2005. The consultant has completed the study and submitted the final report on December 2005. The study basically pursued the long run marginal cost approach, which ultimately proposed a tariff with various options for both inter connected system and self contained system.

d) Power System Expansion Master Plan

The component was envisaged to carry out a comprehensive study of the Ethiopian Power System Expansion Master Plan. The component comprises a set of activities which include: power

market forecast, setting a hydropower and energy planning criteria, generation resource, generation expansion planning, transmission planning and interconnection, financial analysis and long run marginal cost. The consultant submitted the final report on December 2002 and later updated by own staff with two scenarios' (moderate and target forecast) on April 2004; this report was also reviewed by independent consultant and submitted the final report on August 2005.

e) Fixed Asset Revaluation

In the state of reorganizing the state owned electricity utility (the former EELPA) to the present stage with a title EEPCo, it was a pre requisite to undertake asset revaluation. Agreement reached by the time to initiate this component. Immediately the procurement process continued and finally contract signed with the consultant. The scope of the consultancy service include: 1) asset type reclassification, inventory, tagging and coding; 2) economic useful life adjustment; and 3) current market replacement cost determination and financial impact analysis. The consultant completed the study and submitted the final report on October 2001. The proposal presented to the Council of ministers and obtained approval on July 2003. Following this the revalued amount incorporated in EEPCo's financial statements starting from 2004.

3. Achievement of Project Objectives and Output

3.1 Project Development Objectives, Key Performance Indicators, Critical Assumptions and Risks

Project Development Objectives	Key Performance Indicators	Critical Assumptions and Risks	Status and comments
1. Improve the efficiency and sustainability of Ethiopia's power sector, and increase electricity use for economic growth and improved quality of life;	Capacity reserves of 10% in terms of firm energy and of 30% in terms of installed capacity. Total system failure of no more that 3 per year 100 % new industrial connections be met; Installed capacity increased by 184 MW at Gilgel Gibe with no cost overrun	<i>A critical assumption is that Government will successfully restructure EEPCO and improve its operating performance</i>	Yes, achieved Yes Yes System installed capacity increase by 184 MW; this accompanied by cost over run mainly contributed by unforeseen geological failure.
2. Improve the utilization of rural renewable energy	<ul style="list-style-type: none"> ▪ Complete inventory of biomass resources in Northern Ethiopia ▪ Help establish agency to deal with Rural Energy 	None	

3.2 Project Outputs, Key Performance Indicators, Critical Assumptions and Risks

Project Outputs	Key Performance Indicators	Critical Assumptions and Risks	Status and comments
<p>1. Restructured power sector:</p> <p>a) Promote private sector participation;</p> <p>b) with correct pricing system; and</p> <p>c) Strengthened, commercialized EEPCO.</p>	<p>By end of 1997, the following is in place:</p> <p>rules facilitating private participation in the power sector;</p> <p>a regulatory agency (by end of 1997);</p> <p>an adequate pricing system;</p> <p>third party access to the grid; and</p> <p>EEPCO converted into a for-profit corporation by end of-1997</p>	<p><i>Government's long term commitment to reform is critical</i></p>	<p>Electricity proclamation issued on 1996 inviting privates to participate in the power sector.</p> <p>The agency established in 1997.</p> <p>EEPCo reorganized with the basic motto commercialization and decentralization before the end of 1997.</p>
2. Increased electricity generating capacity	EEPCO's dependable capacity increased by 184MW at Gilgel Gibe by 2003 with no cost overrun, increasing Ethiopia's firm generation capacity by 664 GWh per year	Unforeseen phenomenon (like geological failure) for the construction of such a big plant should have not been over sighted.	Dependable capacity increased by 184 MW in year 2004; while firm generation capacity increased by 722 MWH, higher than the initial estimate of 664GWH during appraisal.
3. Complete data on biomass resources in Northern Ethiopia	Completion of resource Atlases and formulation of strategic plans for 6 regions	None. The implementing agency has good experience.	
4. Establish a capability to deal with Rural Energy	Rural Energy Group established by June 30, 1999	Government's commitment to rural energy development is critical.	

3.3. Project Components and Status, Key Performance Indicators, Critical Assumptions and Risks

Project Components	Key Performance Indicators	Critical Assumptions and Risks	Status and comments
<p>1. Support of power sector reform program.</p> <p>(a)</p> <p>(i) Study tours for policy makers;</p> <p>(ii) TA in implementing reform,</p> <p>(b)</p> <p>(i) Tariff Study;</p> <p>(ii) Training in regulatory and agency staff;</p> <p>(c)</p>	<p>Study tours completed by June 1998.</p> <p>New Electricity Proclamation in place by end-1997</p> <p>Tariff Study completed by April 30, 2001</p> <p>Training completed by end-1999</p>	<p><i>For (a): Little risk as Government task forces have sufficiently clear objectives and enough understanding of issues to deign a regulatory system for the power sector, creating incentives for private investment.</i></p> <p><i>For (b)(i) : Parliament approves the proposed new tariff structure without major changes.</i></p>	<p>Yes</p> <p>Tariff study completed by December 2005,after a year delay; late completion of Master plan due to the decision of incorporating the development program of the</p>

Restructuring and strengthening of EEPCO (i) assistance in corporatization and reorganization; (ii) assistance for asset reevaluation; (iii) assistance, training and IT for decentralizing billing and accounting; (iv) manpower development; (v) assistance in IT to improve operation planning, (vi) system expansion study	Utility incorporated as profit enterprise by end-1997 Asset revalued by November 30, 1999 Utility's commercial operations and accounting system decentralized by mid 2000 Training program in place Operations planning model installed and in use by mid-1999 Expansion study completed by August 31, 1999	<i>For (c) (i) : Government is committed to commercializing the utility.</i> <i>For (b) (ii): EEPCO must incorporate results in the accounts.</i>	Government/EEPCo contributed for the delay. Asset revaluation completed on October 2001. Accounting and billing decentralization will be completed by the end of March 2006. Power system expansion master plan study completed on December 2002; updated by own staff on April 2004 and reviewed by consultant on August 2005.
2. Construction of 184 MW Gilgel Gibe hydroelectric plant	Gilgel Gibe commissioned by mid 2002 with no cost overrun	None. The construction will be contracted out to contractors of international repute with adequate guarantees in the contract for finishing on time and within budget	Implementation problems: or delays. Please provide reason(s) and procedures taken to resolve issue. Any Procurement issues such as claims with contractors. Any complaints to the Bank.
3. Improvement of rural energy efficiency and data base (a) Wood biomass survey (b) Assistance in establishing group to deal with rural energy.	Survey completed by 2002 Rural group established and fully functioning by 2000.	None. The implementing agency has good experience	How effective is the survey? In what activities has the Rural Group been involved?

4. Project Cost and Financing

For the execution of the Energy II project a total of MUSD 295.89 allocated ; the share of IDA 199.984, EIB 64.38 NDF5.77, and EEPCo 25.756 and the corresponding expenditure looks as 199.7, 72.82, 10.28 and 71.82 respectively. Following tables summarizes financial performance, by component and financing institutions.

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

	Appraisal Estimate	Actual/Latest Estimate	Percentage of Appraisal
Component	US\$ million	US\$ million	
1. Support of Power Sector Reform	8.93	23.21	259.9
2. Construction of Gilgel Gibe hydroelectric plant*	281.88	331.41	117.6
3. Improvement of Rural Energy Efficiency and Data Base	5.08		
Total Project Costs	295.89	354.62	119.8
Total Financing Required	295.89	354.62	119.8

- Note:**
- Emergency recovery cost estimate included.
 - The cost estimate includes only for EEPCo's components.

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

Component	Appraisal Estimate				Actual/Latest Estimate				Percentage of Appraisal			
	IDA	Govt.	CoF.		IDA	Govt.	CoF.		IDA	Govt.	CoF.	
			NDF	EIB			NDF	EIB			NDF	EIB
1. Support of Power Sector Reform	3.16		5.77		9.78	3.15	10.28		309.5		178.2	
2. Construction of Gilgel Gibe hydro electric plant*	191.744	25.756		64.38	189.92	68.67		72.82	99	266.6		113.1
3. Improvement of Rural Energy Efficiency and Data Base	5.08											
Total	199.984	25.756	5.77	64.38	199.7	71.82	10.28	72.82	99.9	278.8	178.2	113.1

4.3 Summary of Technical Assistance undertaken by the Project

TA	Firm/Consultant	Contract Amount (MUSD)	Signature Date & Completion Date	Provide comments
Tariff Study	Scott Wilson Piesold	0.943	April, 2002	
Master Plan	Acres International. Parsons Brinker	1.813	June 1999 May 2005	
Billing & Accounting Dec.	Norconsult	2.826	Nov. 1999	
Manpower Dev't	SMEC International	0.600	Sept. 2003	
Fixed Asset	Fichtner GmbH	1.438	July 1999	
Gilgel Gibe	Enel/Elec	19.212	June 1995	

5. Major Problems Encountered during Implementation

The energy II project has successfully been completed. The Bank's commitment together with the borrower's effort contributed a lot towards achieving the objective/output set during appraisal. The success of the project, however, was accompanied by delay of some components, completed behind the original schedule. Listed below mainly focuses on factors contributing for the delay:

- Unforeseen geological failure almost at all civil work in the case of Gilgel Gibe; this has led to contract amendment and additional cost;

- The involvement of many independent contractors in the case of Gilgel Gibe , has created an interfacing problem that contributed for the delay;
- Longer procurement process at the stage of tender preparation and approval; this had a significance influence in the case of Accounting and billing system decentralization where the tendering process has taken quite significant time, the same is also true for obtaining approval from NDF for additional budget.
- Handling the controversial issue of load forecasting has taken longer time, the cornerstone of power system expansion plan. The circumstance has forced to update the master plan for the second time by own staff, which is scheduled to complete soon. This has also contributed for the late completion of the Tariff study.

6. Bank Performance

The performance of the Bank starting from conception (appraisal stage) up to the completion of the project is praise worthy. The realization of the project made possible EEPCo to own the biggest hydro plant ever constructed and became operational. A great achievement was also recorded along the effort of upgrading the institutional capacity. The bank's contribution towards achieving the project can specifically put as:

- Technical advices at all procurement stages safeguarded institutions in bringing eligible companies/contractors and consultants.;
- Timely approval of disbursement requests;
- The regular visit of the technical mission of the Bank that has created an opportunity to extend any support found outstanding and also laying ground for the next milestone tasks;

With all these strong points commendable, delay of obtaining “ No Objection “ , as noticed on some components, is believed yet a room for improvement.

7. Lessons Learned

The completion of the Energy II project made possible EEPCo to achieve a lot. The commissioning and operational of Gilgel Gibe Plant, the biggest hydro plant, has significantly contributed in overcoming the power shortage. The coming of the plant at the right time prevented form worst option of power shading, which adversely affects the economy. Joint effort of the two parties (The Bank and EEPCo) did led to achieving the set objectives. In relation to this, the success of the resettlement program is highly commendable. In addition to resettling more than 700 families at a better environment than they were used to live before, it serves as a model for future similar construction.

The realization of the project further created an opportunity to build the institutional capacity of executing agencies. Following is major achievements in this regard.

- The technical assistance extended during implementation, particularly institutional strengthening components made possible carrying out the same responsibility on its own. The planning department of EEPCo is now in apposition to properly utilize the model for any master plan update changes; this is witnessed by the consultant who reviewed the updated master plan produced by own staff on April 2004. The second time updating of the master plan is undergoing and hopefully will be completed shortly. The same capacity is also built in tariff study.

- The Man power Development component through its intensive training program made possible building in-house capacity to carryout similar program on its own with out seeking any outside support. In addition, the learning resource center established during implementation laid a good ground in transforming EEPCo into a learning organization.
- The expertise gained during the implementation of the Fixed Asset Revaluation component has created an opportunity for EEPCo to take over the responsibility. After the completion of the component (October, 2001), all possessed new assets up to the period year 2005 have been recorded and entertained in the financial statements on its own using the same methodology; this marks the knowledge transfer being institutionalized.

On the other hand the execution of the project did also witness cost overrun particularly in the case of Gilgel Gibe hydro plant. Unforeseen geological failure on the civil work, the major factor contributed for the cost escalation, forced EEPCo to cover a significant share beyond the amount allocated by the Banks. This entails proper attention for risk and uncertainty during appraisal is yet to be desired.

EMERGENCY RECOVERY PROGRAM

1) PROJECT OBJECTIVES:

*The objective of **Emergency Recovery Project (ERP)** electric power component is to rehabilitate and reconstruct power supply facilities in war affected areas and procure equipment and goods to replace those stranded at Assab Port.*

The ERP-EEPCo component is financed by reallocating resources of about MUSD 10 from the ongoing IDA- Financed Energy II Project. This amount covers the supply portion; while EEPCO takes the share for the construction part.

The following contract packages were designed for the supply.

- Contract- A "Supply of Distribution Materials"*
- Contract- B " Supply of Substation Material and Equipment"*
- Contract- C "supply of Transmission Line Material"*
- Contract -E " Supply of Diesel Units"*

2) Supply and Delivery

2.1) Distribution

All distribution materials (Contract A) have been delivered.

2.2) Substation

All materials have been delivered to site except damaged items.

2.3 Transmission

All materials have been delivered to site.

2.4 Diesel Generating Set

The generating set including transformers were delivered to EEPCo's Ware House.

3) Project cost

The total finance utilized to date is about MUS\$ 4.2.

Ethiopian Electric Power Corporation

GILGEL GIBE HYDROELECTRIC PROJECT

COMPLETION REPORT ON ENVIRONMENT AND RESETTLEMENT

MARCH 2006

Environmental Issues Of Gilgel Gibe HEPP

Environmental Impact Assessment (EIA) for Gilgel Gibe Hydro Electric Power Project (GGHEP) was produced in 1997 by an Italian consulting firm named ENEL/ELC. The purpose of the EIA study was to predict the negative environmental impacts that were likely to occur as a result of preparing, constructing and operating of the Project.

Since the beginning of the construction work, GGHEP of EEPCo has fully incorporated the environmental management & monitoring activities into its different construction areas.

According to the EIA recommendation, the project has established the Environmental Monitoring Unit (EMU) at work site level, since September 1998. The Unit was staffed by qualified personnel (one Environmentalist, one Sociologist and one Forester). The Unit was involved in monitoring and helped in mitigating the predicted environmental, social & health impacts that were occurred during the construction & operation periods.

I. Major Environmental issues during construction are:

1. Monitoring contractors' compliance
 - Dumping areas
 - Quarry Site

- Borrow sites
 - Water pollution
 - Water borne diseases
 - Chemicals, used oil, etc
 - Solid and liquid waste
 - Compensation flows
 - Others
2. Project forest clearing operation
 3. Project buffer zone management
 4. Archeological survey
 5. Road re-alignment
 6. HIV/AIDS and STDs health education program

1. Contractors' compliance on environment, health & safety issue

The project has given greater attention for health & safety status of the contractors' construction workers & other environmental related issues.

1.1. Dumping Sites:

Totally about six mucks and spoils dumping sites were used during the construction period as per indicated in the EIA document. The Contractors after commencement of major excavation works have asked for some more dumping sites, out of which some were approved by EMU and others were not approved.

This was one of the environmentally sensitive case EMU has faced during construction phase.

1.2. Quarry areas:

One quarry site was used all through out the construction period in order to extract material for the construction activities. The quarry site was intensively used and the site was left open /untreated without rehabilitation. The overburden was also thrown over the cliff into the natural water course.

At present, the road upgrading contractor is extracting quarry material for Addis Ababa -Jimma highway No. 7 upgrading work.

1.3. Borrow Site:

Only one borrow site was selected in order to extract select material for dam fill purpose. Careful extraction of the material was undertaken by the Contractors not to affect more area unnecessarily.

1.4. Water Pollution:

There was significant amount of stream pollution coming out from discharges of construction sites. After careful assessment, EMU proposed the use of sedimentation ponds to enable the turbid matter and contaminants to settle down in the ponds. When the ponds were full with dirt, the contractors clean it up and dump it at the designated dumping sites.

1.5. Water borne disease:

The EIA study revealed that malaria, onchocerciasis and some helminthic infections (including bilharzia or schistosomiasis) are the major disease threat in the project area. To overcome this problem, people residing in the buffer zone (500 m above maximum reservoir water level) were resettled. The buffer zone was revegetated in order to help as a barrier to keep away mosquitoes from flying into individual's residence. The surrounding people were told not to swim, wade or wash in the reservoir water.

1.6. Chemicals, used oil, etc:

Fuel stations and other chemicals were located far away from water sources in order not to causing stream pollution. In addition to this, car washing shades were also located at a distance from the river course. In order not to aggravate soil and water pollution, the Unit proposed to the contractors to construct grease/oil trap which was practically applied in the construction sites.

The used oil was properly collected in a closed barrel /container and later on transported for recycling purpose.

1.7. Solid and liquid waste disposal:

Solid waste was properly collected in a portable receptacle with handle and cover at every work site. The collected waste was regularly transported to the final dumping pits prepared for the purpose. When the pits are full or at the end of the construction phase, all the solid waste dumping pits were covered by soil and landscaped.

All liquid waste/from laundry, sewerage, kitchen, etc/ were properly disposed off in the septic tanks.

1.8. Compensation/ amenity flow:

According to EIA study, 1m³/s compensation flow will be allowed to flow and 5.28m³/s on an average will be spilled monthly through bottom outlet. This compensation flow will provide a balanced flow for the 16 km long down stream stretch users. This will be augmented by about 4 small streams downstream. These jointly will minimize downstream effect on ecosystem and users.

1.9. Others

- Regular monitoring to the work sites and camps in order to make sure, that the contractors' employees are working in a conducive and healthy environment.
- There were adequate supply of personal safety wears and equipment in the construction working areas
- Workers have been properly oriented before starting work on how to wears and equipment in the construction working areas.
- The clinics were working smoothly. They were well equipped and staffed.
- The first aid stations were similarly working well. They are equipped with ambulance cars & other first aid facilities.
- The Contractors have provided sufficient clean and potable water supply.

2. Project forest clearing operation

As predicted in EIA study, the natural vegetation including the riparian forest and the woody savannah were totally removed from the dam reservoir area of 40 km² during the construction period.

The purpose of reservoir area forest clearing is to avoid the adverse water quality due to high nutrient load and oxygen deficiency in the reservoir was compulsory to clear all the large woody vegetation the dam impoundment.

The reservoir area was occupied by some 300 ha of partially degraded riparian forest and the remaining area consists of cultivated and grazing lands with remnants of the transitional zone and savannah woodland.

The project has thus cleared all the woody vegetation from the reservoir area prior to the reservoir inundation. The woody biomass totally cleared is estimated to be about 80,000 m³.

3. Project buffer zone management

As the project construction activities entails the removal of natural vegetation, a buffer zone of about 4,000 ha of land encircling the reservoir area has been created to compensate the loss of riparian vegetation including the woody savannah and its wildlife habitat. Besides the area closure, the project has already commenced the buffer zone reforestation program since 2001 by establishing tree nursery & producing different multipurpose tree seedlings.

As a compensation measures, a buffer zone of about 4,000 ha was established all around the reservoir area.

The species selected for plantation were of indigenous and exotic types characterized to develop rapidly on poor soils.

S. No.	Year	No. of trees planted	Buffer zone covered by plantation and natural revegetation (ha)
			Areas covered by plantation Areas covered by natural vegetation Total area covered
1	2001	175,000	70
2	2002	200,000	80
3	2003	200,000	80
4	2004	200,000	80--
			130
			110
			3070
			210
			190
			110
Total	775,000	310	270580

The buffer zone as a whole is expected to be revegetated both by plantation and natural regeneration. The buffer zone management generally helps to produce a suitable micro climate to offset the lost woody biomass resources, restore the wild animals and control soil erosion and minimize sedimentation flow into the reservoir, helps as a barrier from mosquitoes. The Unit has taken preventive measures to protect the natural vegetation against fire and encroachment.

Totally 775,000 different indigenous and exotic tree species planted around the reservoir from 2001 to 2004 covering 310 hectares of land as it is shown in the table above.

As to survival of trees planted, it can be said that, it is generally satisfactory. According to the result of the survival count measurement, about 75 % of the planted tree seedlings were found survived, which is encouraging.

So far (from 2001-2004) over 580 ha of the buffer zone area has been covered by plantation & natural re-vegetation, especially on erosion prone areas.

4. Archeological survey

As the cultural heritage assessment was not exhaustively carried out earlier during the EIA study, EEPCo fully accepted the proposal from the Authority for Research and Conservation of Cultural Heritage (ARCCH) and prepared a contract document for the implementation of the archaeological survey without hampering the inundation schedule by allotting the necessary fund.

The ARCCH archaeological survey team comprising of foreign consultants has commenced their field operation in April 2002 and has completed their activity in June 2002.

5. Road re-alignment

As part of high way No. 7 is partially inundated by the reservoir water, the Ethiopian Road Authority (ERA) has designed and constructed an emergency new route for temporary use. The construction work was started early January 2002 and opened for traffic the same year.

EMU has been monitoring whether the new road re-alignment crosses through the buffer zone or not, which later on was confirmed that it will not affect the buffer zone.

6. HIV/AIDS and STDs health education program

As predicted in the EIA study, to curb the increasing threat of communicable diseases, in particular HIV/AIDS, the project has carried out a health education campaign in collaboration with Zonal Health Department and the Ethiopian Red Cross Association branch of the Jimma Zone.

The focus target groups were:

- Project workers (GGHEP staff, Contractors' employees, and Consultant's staff).
- Surrounding urban dwellers (Sekoru, Deneba and Asendabo towns).
- Resettled and host communities.
- School students and teachers.

Totally, health education was given for about 11,000 people from different target groups from December 2nd - 11th 2000.

The educational sessions were supported by audio visual and other IEC material, like leaflets, booklets, brochures, posters, etc.

EMU in collaboration with Woreda HIV/AIDS Control Office has also conducted health education program on 5th October 2003 for EEPCo staff and employees of both Salini and Zublin Contractors.

II. After project completion

Measures taken by the contractors to restore the surrounding project area are:

- The borrow area was properly landscaped.
- Most of the mucks and spoils dump sites were also properly landscaped, except in some areas where the spoils and quarry overburden were not restored.
- The quarry site was not rehabilitated, it was planned to be used by the road upgrading contractor.
- Stockpile area for quarry materials was properly landscaped.
- Contractors' construction camp sites were all remove.

III. Projects compliance to Environmental requirements

More or less all the critical environmental issues were properly taken care of through the Units' effort and contractors' proper compliance to environmental clauses. However, in general terms, the contractors were reluctant comply with environmental requirements.

Part of the reason for lack of willingness on the part of the Contractors is that enforcing mechanisms were not sufficiently addressed in the contract document.

IV. Lessons Learned

- Considerations on environmental and social issues on Gilgel Gibe Hydro Electric Power Project were paramount. It was the first in its kind for the power sector that became a model for other similar projects.
- Based on the experience of GGHEP environmental activities' EEPCo has established an office at corporation level, in order to take due environmental care for all power projects.

Rsettlement at Gilgel Gibe HEPP

Back Ground Information

Gilgel Gibe I Hydroelectric Power Project is located some 250 km West of Addis Ababa and 70 km North East of Jimma, in Omo Nada and Kersa Weredas of Jimma zone in Oromiya Regional State.

Similarly, the resettlement sites are located in the Jimma Zone of Oromiya region in kersa and Omo Nada Woreda. They are located at about 280-300 km from Addis Ababa.

The constriction of Gilgil Gibe Hydroelectric Power Project has adversely affected the lives of people. There were 706 households displaced by the Project, out of which 562 households resettled through government assisted resettlement scheme and 144 households preferred to be resettled by themselves.

The construction of the dam has disrupted household income sources of Project Affected Persons (PAPs), expropriated agricultural farm land, demolished business and residential houses located in the project area, and forcing PAPs to involuntary resettlement.

In order to mitigate the adverse impact of the resettlement programme was planned and implemented from 1999 to 2000 and the PAPs were resettled in nine resettlement sites that are located in Kersa and Omo Nada Weredas of Jimma Zone. The proximity of the resettlement sites from their departure or previous location varies from 5 to 30 km distance. The host communities and the resettled households are from the same ethnic group, speak the same language, and practice the same religion and are from the same cultural background.

1. The establishment of GGI resettlement project

To assist the Federal Government of Ethiopia, the World Bank approved in December 1997, IDA credit of US\$ 200 millions to build the Ggel Gibe Hydro Electric Power plant. Ethiopian Energy II is the Bank's name of the project. The Ethiopia Electric Power Project (EEPCo) was designated as the implementing agency. The reservoir of the power plant was estimated to cover an area of 6,200 ha, thus inducing land acquisition and involuntary resettlement. An Environmental Assessment (EA) including Social Assessment (SA) was carried out and a Resettlement Action Plan (RAP) was prepared to address the adverse social impacts.

A detail survey of the number of project affected persons (PAPs), identified 738 households to be affected. In Addition, 367 households under the transmission line were identified to be partially or totally affected. All together about 5,000 people were assumed to be resettled. Those numbers made Gilgel Gibe, the second most Bank supported resettlement operation in Africa 1998-1999, the other one was Manantali in Senegal (2200 households, 11,0000 PAPs).

To execute the Resettlement Action Plan (RAP), a resettlement office under EEPCo was set up as a component of the Gilgel Gibe Hydroelectric Power Project. Staff from EEPCo, the Jimma Zone Administration and representatives of PAPs undertook a full inventory of private and public property including selection of the arrival sites. Settlement sites were 3-30 km far from their area of origin, was selected out of three potential sites prospected.

2. Agricultural activities

For the first resettlement year the project has plowed 2 ha of land for each resettled households. Improved seeds and chemical fertilizer were supplied for the first year. The agricultural extension workers also assisted the resettled households and home agents for improved farm practices, tree planting, drainage structures, in door environment.

3. Resettlement Project Achievements

The relocation of PAPs was completed in 2000. It was followed by a quality assurance period of one year, to monitor and provide additional assistance. The implementation of the resettlement was considered successful, both by the Bank and by the client. The main achievement of the project was the following:

- The civil works at the Gilgel Gibe Hydroelectric Power Project were completed in December 2003. The plant was inaugurated in January 2004.

- The resettlement was completed 2 years ahead of impounding, 4 years ahead of completion of civil works.
- Social infrastructure built includes 971 tin roofed houses, 1 health clinic, 1 veterinary clinic, 1 school building, 3 houses and offices for agricultural extension agents, 3 mosques, a church and a market place.
- All members of PAPs households were provided medical check up, and treatment. The medical records were computerized and handed over to the new health clinic built to serve PAPs and host communities.
- All PAPs were given 2.5 hectare of land, one hectare more than the average farmland in the area of origin.
- PAPs' farms were cultivated with tractors, by an EEPCo contractor the first resettlement year; likewise, fertilizers were sponsored by EEPCo and delivered timely the first resettlement year.
- About 231,900 trees were planted in the resettlement sites; the survival rate is about 60%.
- School enrolment amongst PAPs per year in the first grade for 171 students, the first year of resettlement children increased from about 10 students.
- The project is the first well-planned and implemented resettlement ever made in the history of Ethiopia.

4. Resettlement implementation cost

The total expropriation cost of immovable property was estimated at US\$ 8,611,000. The funds required were made available by the Federal Government of Ethiopia, to the Oromiya Regional Government before credit approval by the Bank. The resettlement cost per household was estimated at US\$ 4,600 per household, which is below the international average for a 180 MW hydro power plant.

5. Land allocation

In the resettlement sites, land is equally distributed to all resettled households and has received 2.5 hectares of land and there is not a single household that does not have land in the resettlement sites. The egalitarian form of land distribution has benefited those households who did not have land in their previous settlements. Those households, who did not have land in their previous location, are now economically and socially better off since they are able to own farmland.

6. Types of Houses

The housing types in the previous locations were mainly constructed of thatched roof whereas in the resettlement sites, all houses are constructed with corrugated iron sheet.

All the resettled households were provided with residential houses that have equivalent size to their previous houses and constructed with CIS roof. This is a major change in the quality and standard of their living condition. The houses in the resettlement sites also have different rooms for human and livestock, which is better than their former houses.

7. Relation of resettled communities with the host community

The resettled communities share a number of resources with host communities living in their surroundings. The shared resources include grazing land, burial place, clinic, school, agricultural development agent, water resources, mosques, church, etc. Certain resources or infrastructures, even though, were constructed or allocated for the benefit of the resettled household, the host communities have also become one the beneficiaries of the services.

8. Social and religious infrastructures

Different social and religious infrastructures were constructed by the resettlement project office for the use of the resettled households. The social and religious infrastructures constructed for the resettled households include: -

- Primary schools
- Health clinics
- Veterinary clinic
- Access roads
- Water wells
- Mosques and churches.

8.1 Primary school

One primary school was constructed at site 5 and, two other primary schools were rehabilitated in sites one and five. Most households, children attend schools constructed by the resettlement project. The average distance traveled by student from their houses to schools has been reduced after the resettlement program.

8.2 Health Clinic

There is one clinic constructed for resettled households and located in Bulbul town. The clinic is not well equipped, faces shortage of medicine and does not have any power supply system.

In the resettlement sites, people have got better access to health service as compared to their previous locations. The health center is near to the residential places of the inhabitants.

8.3 Veterinary clinic

One veterinary clinic built at Bulbu town for the use of resettled and host communities. The building of the vet. clinic is found in a very good condition. The clinic provides animal health service for the resettled population.

8.4 Access Road

Access roads were constructed in all the sites, except those roads located near to the main road; all of the other roads were easily damaged due to water logging. Lack of drainage facilities has further worsened the condition of the roads as a result of the resettlement sites are completely in accessible especially during rainy seasons. The absence of the access roads is one of the major constraint that have affected the accessibility of the resettled households.

8.5 Water well

The resettlement project constructed 14 water wells, out of these; sites number 3, 4 and 6 have two wells each. The other 6 sites have got one water well each. Currently the water wells are functioning but they do not have adequate yields to satisfy the demand of the resettled communities especially during dry season. During the rain season also, the volume of water reduces significantly due to slippage of water through cracks of the water walls

8.6 Development Agent offices

The resettlement project constructed three development agent offices at sites 3, 6 and 8. All the three offices were found in good condition except the office at site 8, its roof is affected by wind and so far it is not yet maintained.

9. Religious Institutions

9.1 Mosques

At the resettlement sites, 4 mosques are constructed at sites 2, 3, 5 and 9 and their overall conditions are rated good and are serving the resettled and host communities properly.

9.2 Church

In the resettlement site, one church constructed for the settlers and it is found in a good condition and serves the community properly. Residents of Asendabo and Gibe towns are also among the users of the church.

10. Overall Compensation (Rehabilitation) performance

The review of the RAP by the consultant ENEL and project progress reports combined with field observations suggests that overall rehabilitation scheme have been satisfactory. The relocation of PAPs was timely done. Likewise, compensation was timely paid to all PAPs. The social organization of the PAPs has been settled, their social net works and their relationship with the host communities have been strengthened, and they all seemed to know each other.

In relation to the above point the EMU staff members site visit report on 20 January 2006 in the resettlement area state that:

All PAPs consulted gives great value for improved houses, access to potable water, close access to the mosques and to the church, as the main assets of the resettlement. The houses were well constructed and many had their living rooms painted with earth colors. Discussing the housing situation, most of the resettled community expressed that they felt like living in modern urban facilities, and, they were better off now, than the people they left in their area of origin.

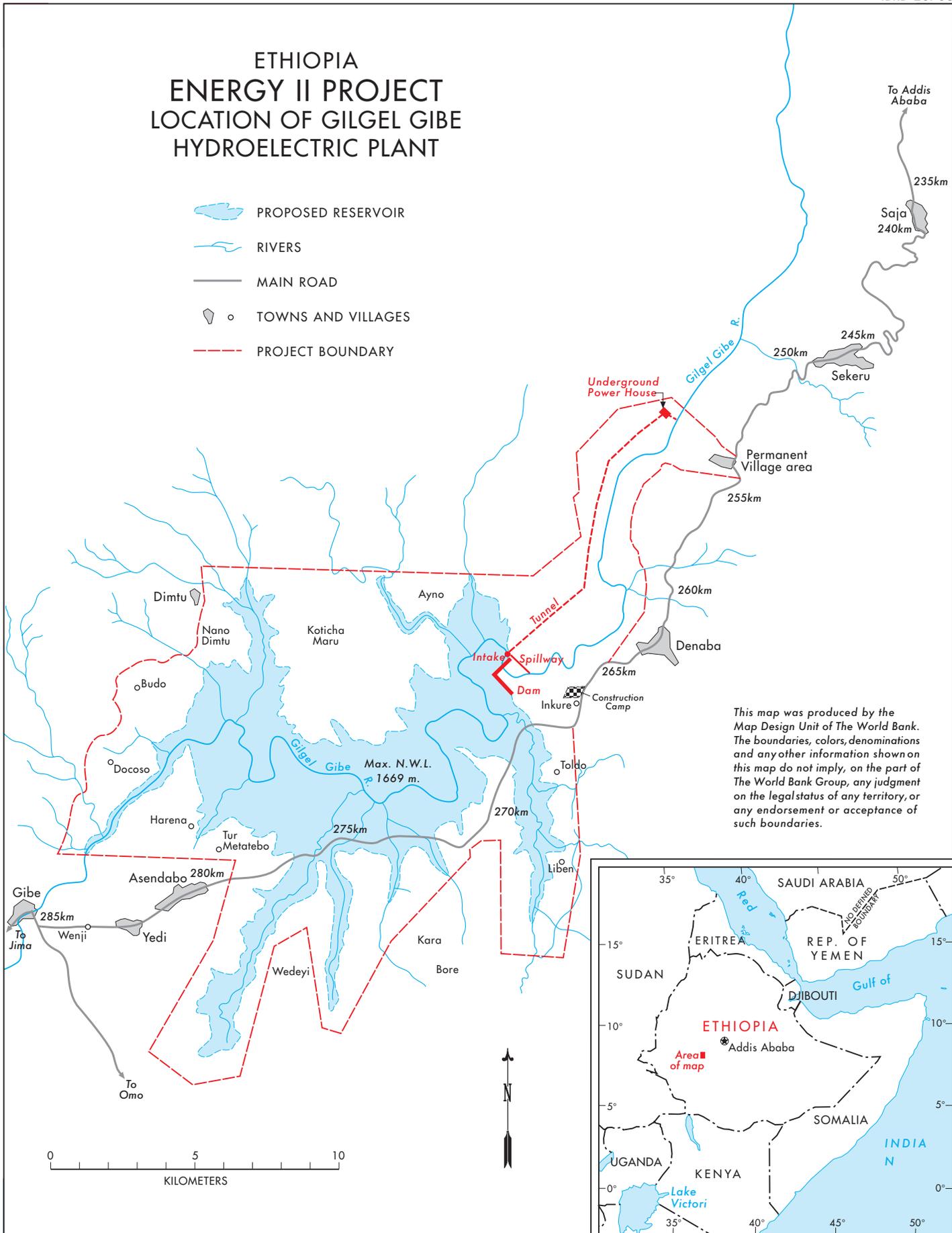
Intermarriages between PAPs and host communities were reported at each resettlement site, the first marriages took place already, within the first year of the relocation. The PAPs and the host population worship together in the mosques and church, respectively. All PAPs houses have been yearly sprayed against mosquitoes, since relocation in 2000. In addition, one mosquito net has been provided to each household.

11. Conclusion

In January 2001, following a visit to the resettlement area, the parliament of Ethiopia acknowledged the satisfactory completion of the project. It declared the project as a model for future resettlement in the country. In June 2001, Bank's Board, after a field visit of the Gilgel Gibe resettlement, acknowledged the project to be the best in East Africa and suggested that it be used as a good practice in the region.

ETHIOPIA ENERGY II PROJECT LOCATION OF GILGEL GIBE HYDROELECTRIC PLANT

-  PROPOSED RESERVOIR
-  RIVERS
-  MAIN ROAD
-  TOWNS AND VILLAGES
-  PROJECT BOUNDARY



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