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Report No: 43732-ER

PROJECT PAPER

ON A

PROPOSED ADDITIONAL FINANCING GRANT

IN THE AMOUNT OF SDR 10.8 MILLION
(US\$ 17.5 MILLION EQUIVALENT)

TO

THE STATE OF ERITREA

FOR A

POWER DISTRIBUTION AND RURAL ELECTRIFICATION PROJECT

May 19, 2008

Energy Group
Sustainable Development Department
Africa Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective May 16, 2008)

Currency Unit = Eritrean Nakfa (ERN)
15.375 ERN = US\$1
1.630 US\$ = SDR 1

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

ARGeo	African Rift Valley Geothermal Program
bb1	barrel (crude oil)
cSt	centistoke
DSCR	Debt Service Coverage Ratio
EEC	Eritrean Electric Corporation
EIRR	Economic Internal Rate of Return
EMP	Environmental Management Plan
ERC	Eritrean Regulatory Committee
ESA	Environment and Social Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
GEF	Global Environment Facility
FMR	Financial Monitoring Report
FRR	Financial Rate of Return
GoE	Government of Eritrea
GWh	GigaWatt hour
HAMSET	HIV/AIDS/STI, TB, Malaria and Reproductive Health Project
HIV/AIDS	Human immunodeficiency virus/ Acquired immune deficiency syndrome
HFO	Heavy Fuel Oil
IDA	International Development Association
IFR	Interim Financial Report
ISN	Interim Strategy Note
IRR	Internal Rate of Return
kW	kilowatt
kWh	kilowatt hour
LV	Low Voltage
MIS	Management Information System
MEM	Ministry of Energy and Mines
MV	Medium Voltage
MW	Megawatt
NFA	Nakfa
NPV	Net Present Value
PMU	Project Management Unit
RAP	Resettlement Action Plan
ROA	Return on Assets
RPF	Resettlement Policy Framework
SFR	Self Financing Ratio
TOR	Terms of Reference

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ERITREA
Power Distribution and Rural Electrification Project
Additional Financing

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ERITREA
Power Distribution and Rural Electrification Project
Additional Financing

Project Paper Data Sheet

Date: May 19, 2008 Country: State of Eritrea Project Name: Power Distribution and Rural Electrification Project Project ID: P110202	Task Team Leader: Kyran O'Sullivan Sector Manager/Director: Subramaniam V. Iyer / Inger Andersen Country Director: Colin Bruce Environmental category: B		
Recipient: State of Eritrea Responsible agency: Ministry of Energy and Mines (MEM) and Eritrean Electricity Corporation (EEC, a state-owned electricity company)			
Revised estimated disbursements (Bank FY/US\$m.)			
FY	Cumulative to 2008	2009	2010
Annual	27.3	37.4	4.7
Cumulative		64.7	69.4
Current closing date: June 30, 2009 Revised closing date: June 30, 2010			
Indicate if the restructuring is:			
Board approved		Yes	
RVP approved			
Does the restructured project require any exceptions to Bank policies?		No	
Have these been approved by Bank management?		N/A	
Is approval for any policy exception sought from the Board?		No	
Revised project development objective/outcomes (i) Expansion of electricity access in rural areas; (ii) Improve the quality and adequacy of the electricity supply; (iii) Regulatory and institutional reforms in the sector to increase efficiency.			
Does the restructured project trigger any new safeguard policies? No.			
<i>Already triggered Safeguard Policies include the following OPs and BPs: Environment Assessment (4.01), Physical Cultural Resources (4.11), and Involuntary Resettlement (4.12).</i>			
Revised Financing Plan (US\$m.)			
Source	Local	Foreign	Total
Recipient IDA	8.6	0.0 69.4	8.6
Total		69.4	78.0

I. Introduction

1. This Project Paper seeks the approval of the Executive Directors to provide an additional grant in the amount of SDR 10.8 million (US\$ 17.5 million equivalent) to the State of Eritrea for the Power Distribution and Rural Electrification Project (GR H114 ER). The proposed additional grant would support the completion of the ongoing Part A: Asmara component of the project to rehabilitate the distribution system in the city in view of cost overruns arising from higher unit costs of electrical materials. The additional grant would also support a new component for the overhaul and rehabilitation of key power generation plants at Hirgigo, Beleza and Assab. Overhaul and rehabilitation of the generation plants will ensure that electricity supply is maintained and outages are avoided. Overhaul has been postponed as the cost of the replacement parts could not be funded from EEC's capital expenditure program. While well operated power companies finance the rehabilitation of their generation plants from internal funds, EEC cannot presently do so as its revenues have been insufficient to meet its operating expenses since 2006 when international fuel prices began to rise (more than 70 percent of EEC's costs are for fuel purchases for generation). If oil prices had remained at their pre 2006 levels, EEC would have been able to carry out the rehabilitation from its internal resources.

2. The benefits of the rehabilitation of the distribution system (Part A: Asmara component) can only be realized if electricity supply security is ensured i.e. if key generation plants that serve Asmara are overhauled and rehabilitated. In contrast with some two dozen countries in sub-Saharan Africa that are facing acute power crises, Eritrea has managed to date to maintain electricity supply with its oil based generation plants. However, these plants are in need of urgent overhaul and spare parts. Some units already have exceeded their scheduled overhaul time (24,000 hours of operation) and the other units will exceed it in the coming months. Delaying plant rehabilitation would cause the plants to fail, leading to brownouts and blackouts beginning in 2009 and eventually a system collapse within two or three years. Delay would cause damage to the units and increase the cost of carrying out rehabilitation later. The proposed additional financing would thus enable the Recipient to achieve the project targets of serving 90,000 electricity customers in Asmara with reliable service and ensuring continued quality and adequacy of electricity service throughout the country.

3. The total value of the principal contract to implement the ongoing project component for rehabilitation of the distribution system (Part A: Asmara component) has increased from US\$ 31 million to approximately US\$ 39 million due to increase in price of electrical materials and services. Since the undisbursed amount of US\$ 37 million in the ongoing project is largely committed, the increased cost for the Asmara component is proposed to be financed by reallocating US\$ 1.4 million earmarked in the project for rural electrification, expected saving of approximately US\$ 2.1 million due to SDR/US\$ exchange rate change and IDA additional financing of US\$ 4.5 million. Additional financing will enable this contract and project component to be completed and enable the original project objective of improved reliability and quality of electricity supply to be met.

4. Ongoing project activities to strengthen the institutional capacity of key energy sector agencies including regulatory and institutional reforms in the sector to increase efficiency will continue, including a feasibility study for renewable (geothermal) energy development.

5. Restructuring of the project is deemed necessary due to changed country and external circumstances. These include weak non-agriculture growth that has reduced electricity demand growth thus impacting utility revenues, a more difficult operating environment for the private sector and public expenditure restraint that reduces available public funding for electricity

infrastructure maintenance. External factors include continuing high oil prices and steep increases in the costs of electrical equipment (e.g. poles, switchgear & cables). Thus the restructured project objectives are oriented to improving efficiency of electricity service delivery and to the institutional changes that underpin efficiency. By improving efficiency in service delivery and by putting in place appropriate institutional structures, the project will establish the pre-conditions for a sustainable program of electricity service expansion when other country conditions are favorable. The results framework has been revised to be consistent with the revised project objectives and the restructured project components. Financial management and procurement arrangements, institutional roles and responsibilities remain unchanged. The closing date is June 30, 2010.

6. The Project is consistent with the Interim Strategy Note (ISN) FY08-FY10

II. Background and Rationale for Additional Financing

Country and Sector Context

7. Eritrea has one of the lowest per capita incomes in the world (US\$ 200), but has relatively better social indicators. The country's institutional discipline and social cohesion have underpinned these welfare gains. Economic growth was weak in 2007. Border tensions continue to put pressure on public finances. The fiscal position has improved because of tight expenditure control by the government. Price controls and regulations, in addition to the uncertain business climate, have caused private sector activity to fall. Risks to the economic outlook remain high.

8. *World Bank Project Portfolio.* World Bank projects have experienced implementation problems as a result of capacity constraints and the economic environment. However, after a concerted effort to improve portfolio performance including stepped up supervision, projects rated "problem projects" were reduced from 43 percent to 20 percent. Projects at risk remain at about 80 percent mainly due to two country risk flags. The Power Distribution and Rural Electrification Project is currently rated *satisfactory* on the likelihood of achieving its development objectives and *marginally satisfactory* on its implementation progress

9. *Sector Status.* Salient features of the electricity sector that are relevant to the proposed additional financing for the project include the following:

- Electricity access is approximately 33 percent nationally in 2007. This is high compared to other countries that have similar or even higher levels of per capita income.
- In recent years despite two tariff increases since 2004 and an excellent record on billing and collection (95 percent) the utility (EEC) is operating at a loss.
- EEC's financial performance has been affected by slow economic growth. This is reflected in industry's falling share of electricity consumption. From around 60 percent of total electricity consumption in 1997/98, industry's share fell to 26 percent in 2006. Higher sales would reduce EEC's unit costs of electricity produced.
- EEC's financial performance has also been negatively affected by the increase in international petroleum prices. Eritrea imports all the petroleum (heavy fuel oil and diesel) used in its thermal power plants that total approximately 150 MW installed capacity. Less than 1 percent of its installed capacity is from renewable energy sources (850 kW pilot wind project was commissioned and is operational since December 2007). There is good potential

for increased contribution of renewable energy source for electricity supply (about 30 MW geothermal has been preliminarily identified and there is additional wind energy potential).

10. *Government Policy* The Government has updated its Letter of Sector Policy in March 2008 (Annex 6) that outlines near term measures to reestablish EEC's financial sustainability. These include deferral of the transfer to EEC of the debt incurred in the construction of the Hirgigo generation, tariff increase and adjustment of the Nakfa/US\$ exchange rate applied to EEC's fuel purchases. Following transmittal of the Letter, the Government implemented a 10 percent increase in electricity tariffs that is reflected in electricity bills sent to customers in May 2008. In its Letter, the Government also outlines its intent to operationalize the Eritrean Electricity Committee; develop renewable energy resources; rehabilitate generation plants to ensure continued reliability of electricity supply; and promote community and private sector participation in rural energy service delivery.

Project Description

11. The Project was approved on July 6, 2004. The Development Financing Agreement (as amended) for the Project between the State of Eritrea (the Recipient) and the International Development Association (IDA) was signed on September 22, 2004 and became effective on December 20, 2004. The project was financed with a mix of credit and grant. Of the total IDA Credit of SDR 20.0 million, SDR 4.36 million (22 percent) has been disbursed. Of the total Grant of SDR 14.5 million, SDR 8.74 million (60 percent) has been disbursed. The Closing Date was extended from June 30, 2009 to June 30, 2010 on December 12, 2007.

12. *Project's Original Objectives.* The project's original objectives were: (a) carrying out a sustainable program for the expansion of access to electricity; (b) improving the quality and adequacy of the electricity supply in its territory; and (c) strengthening the institutional capacity of key energy sector agencies including regulatory and institutional reforms in the sector to increase efficiency and attract private participation.

13. *Restructured Project's Objectives.* Restructuring of the project is necessary due to changed country and external circumstances outlined in paragraph 4 above. It is appropriate in the current country context to restructure the project's objectives so that they are oriented to improving quality and adequacy of electricity service delivery and efficiency of EEC's operations. Achievement of these objectives will establish the pre-conditions for a sustainable program of electricity service expansion when other country conditions such as stronger economic growth and a more enabling environment for private sector participation in the sector become more favorable.

- 1st PDO: *Expansion of electricity access in rural areas.* The fundamental change in this objective is to adjust the current objective by deferring a programmatic expansion of access with private participation until financing conditions are more favorable. The ongoing project is financing construction of medium and low voltage lines to extend the electricity network to about 59 rural towns and villages. It is anticipated that about 70 percent of households in these towns will be connected to the service on completion of the project. As part of Government's efforts to strengthen EEC's financial situation, EEC's investment program will be curtailed and large investments to expand rural electrification are likely to be delayed during the next few years. Thus, a sustainable program for the expansion of electricity access with private sector participation will necessarily have to be deferred until conditions improve.

- *2nd PDO: Improve the quality and adequacy of the electricity supply.* This objective remains essentially unchanged. The ongoing investment component for the Asmara system rehabilitation addresses this objective. Current system losses are about 24 percent of net generation. Much of the technical losses are due to the aging distribution system especially in Asmara. The electricity distribution system in Asmara (that accounts for about 80 percent of the utility's customers) is more than 40 years old and has high technical losses (18 percent) and poor quality of supply (e.g. voltage fluctuation). It is anticipated that the technical losses in Asmara will be reduced to about 7 percent at the completion of the project. Reduction of power losses will also reduce the quantity of fuel oil EEC would otherwise use to meet demand. At current prices, the fuel savings would amount to more than US\$2 million per annum. The proposed new component for rehabilitation of the generation plants at Hirgigo and Beleza also addresses the objective of improving the quality, adequacy and reliability of electricity supply. These plants are in need of urgent overhaul and spares. Unless the rehabilitation is carried out, the plants will in all likelihood begin to fail i.e. brownouts and blackouts beginning in 2009 and eventual system collapse can be expected after two or three years. Financing the rehabilitation will help ensure that Eritrea manages to avoid such a power crisis.
- *3rd PDO: Regulatory and institutional reforms in the sector to increase efficiency.* The key change to this objective is to focus it on electricity sector operational efficiency improvements which are fundamental to sectoral financial health. A number of institutional development activities under the project will contribute to improved efficiency in sector operations. These include a new billing system that will improve bill accuracy and integrate billing information with a new accounting system thus providing EEC's management with greatly improved customer information. Non-technical losses that are mainly due to metering and billing deficiencies should be reduced to less than 3 percent of electricity sales (i.e. within industry norms) in Asmara upon successful completion of the project. Other efficiencies that will be achieved include improved stock control. Other activities under the project that are focused on institutional strengthening for the Ministry of Energy and Mines include activities to support more transparent regulation and preparation of an Operation Manual for the Government's Rural electrification fund.

The original and restructured project objectives are shown in Table 1.

Table 1

Original PDOs	Revised PDO of restructured project
(a) Carrying out a sustainable program for the expansion of access to electricity.	(i) Expansion of electricity access in rural areas.
(b) Improving the quality and adequacy of the electricity supply in its territory.	(ii) Improve the quality and adequacy of the electricity supply.
(c) Strengthening the institutional capacity of key energy sector agencies including regulatory and institutional reforms in the sector to increase efficiency and attract private participation.	(iii) Regulatory and institutional reforms in the sector to increase efficiency.

14. A revised results framework that is consistent with the project's restructured objectives is included in Annex 5. It shows progress to date (May 2008) in each of the project's components and in its overall objectives.

15. *Proposed Use of Additional Financing.* Additional financing is proposed for the project for the current component Part A *Asmara Distribution Rehabilitation* and for a new component Part F *Rehabilitation of Generation Plants*.

16. Additional financing to meet a financing gap in Part A Asmara Distribution Rehabilitation. The financing gap is due to: (i) a variation order that will replace wooden poles with steel poles; and (ii) price increase following application of automatic price escalation clauses in the contract that are based on changes in international materials prices such as copper, aluminum and steel. These affect the contract between the implementing agency EEC and the contractor for this component (Asea Brown Boveri of Spain). The contract value was US\$ 31.067 million (against which the IDA Credit financed US\$ 28 million). The current estimate of cost overrun is anticipated to be approximately US\$ 8.0 million (US\$ 3.0 million for variation order; US\$4.6 million for price adjustment as per contract terms; US\$ 0.4 million for consultant services). SDR currency appreciation savings of approximately US\$ 2 million will also be applied to the financing gap in the Asmara component. Approximately US\$ 1.4 million earmarked for the rural electrification fund (Part C of the project) will be reallocated to Part A to fill the remaining financing gap.

17. Additional financing for Rehabilitation of Generation Plants (US\$ 13 million). The restructured project includes a new component to carry out overhaul and rehabilitation of EEC's main generation plants at Hirgigo, Beleza and Assab. This use of additional financing falls under category (b) of the Guidelines for Additional Financing which provide for *activities that scale up a project's impact and development effectiveness*.

18. Project Implementation Arrangements. There will be no change to the project's implementation arrangements. The two implementing agencies will continue to be the Ministry of Energy and Mines (MEM) and EEC.

Project Progress

19. *Implementation Progress.* Overall, the project is in good standing and is performing satisfactorily. Its Development Objective is rated satisfactory and Implementation Progress is rated moderately satisfactory. However the implementing agency EEC has not been able to comply with financial covenants largely due to external factors such as an increase in its fuel bill due to sharply increased oil prices and slow growth of electricity sales due to economic conditions in Eritrea. The restructured project has revised financial performance targets based on it achieving financial sustainability in a phased manner – first, meeting its operating costs within the timeframe of the project and in the medium term, meeting all its obligations including debt service. This is a key motivation for restructuring the project and the use of additional financing to ensure the project achieves its development objectives.

20. Substantial disbursements of approximately US\$13 million will be effected in the Asmara component through December 2008 that will reduce the disbursement lag of the project. Orders have been placed and manufacturing is underway for large items of electrical goods in this component including switchgear, cable and transformers. Shipment of large quantities of material has been made to the site and civil works have commenced on a new substation in this component. The rural electrification component has been implementing smoothly and will be completed by June 2008. Components of the project for institutional strengthening (including the procurement of modern billing and accounting systems at EEC and training of finance department staff to ensure its implementation) have been delayed but an action plan to ensure their implementation has been agreed. A plan to complete the installation and implementation of the

new billing and accounting system Management Information System (MIS) by October 2009 has been agreed by EEC and the Consultant.

21. *Risks.* Country factors (e.g. shortages of transport fuels) have contributed to delays in implementation. The Asmara network rehabilitation has experienced delays in its design phase in part because of the complexity in completely replacing the old medium and low voltage (LV and MV) distribution network in the historical center of Asmara. To implement the Asmara electricity network rehabilitation, EEC has entered into a turnkey (design, installation and commissioning) contract with an international company that is one of the leaders in electricity network construction to implement the entire component. Consultants (owner's engineers) financed by the project support EEC in implementing the Asmara component. Additional financing combined with project restructuring is expected to ensure successful completion of the project components and thus establish efficiency improvements that are the pre-conditions for sustainable electricity sector operations once the country macroeconomic environment improves.

Rationale for Additional Financing

22. The Government has requested additional financing in view of a financing gap in Part A of the project (Asmara Distribution Rehabilitation). The financing gap arises for mainly two reasons: (i) change in cost of electrical equipment in part due to increased international cost of metals (e.g. aluminum, steel and copper) used in their manufacture; and (ii) change orders in the final network design. The major change order concerns the partial replacement of wooden with costlier steel poles. The final design specifies use of steel poles in the confined areas of the historic city where it is not possible to use wooden poles with stays. The use of suitable wooden poles of sufficient strength will nevertheless be optimized (e.g. wooden poles of sufficient strength can be used with stays in more open areas of the city where space is not so constricting) in order to avoid unnecessary cost increase associated with the use of steel poles.

23. The Government has also requested additional financing for a new component in the restructured project. This is to carry out overhaul and rehabilitation of EEC's main generation plants at Hirgigo, Beleza and Assab. These plants have been maintained in very good operating condition by EEC to date. All units are now (March 2008) at or approaching the number of hours of operation when they should be overhauled. Deferral of the rehabilitation will undermine the reliability of these plants leading to likely brownouts and blackouts beginning in 2009 and eventual system collapse after two or three years. A key rationale for additional financing is therefore to fund the rehabilitation of the generation plants to ensure that Eritrea manages to avoid a power crisis. While well operated power companies finance the rehabilitation of their generation plants from internal funds, EEC cannot do so as its revenues have been insufficient to meet its operating expenses since 2006 when international fuel prices began to increase. If oil prices had remained at their previous 2006 levels EEC would have been able to carry out the rehabilitation from its internal resources.

III. Proposed Changes

24. Proposed change relates to the project costs and financing plan, project objectives, outcome indicators, project scope and closing date as detailed elsewhere in the Project Paper. Project funds (SDR 970,000) that were earmarked for Part C Rural Electrification Fund will be reallocated to partially meet the financing gap in Part A of the project. Therefore, sub-projects that were part of Part C in the original project will no longer be financed. Procurement arrangements have slightly altered. Thresholds have been reset and a few categories of procurement deleted from those allowed as they are no longer envisaged. Financial management, institutional roles and

responsibilities remain unchanged. Revised project costs and financing plan are presented in Annex 1.

25. An additional study will be undertaken by the Ministry of Energy and Mines as part of the ongoing studies program (Part D.1. of the project) to carry out surface exploration (geochemical and geophysical surveys) at Alid where there is geothermal potential (30 MW). This study will provide necessary information on which a proposal under the GEF financed ARGeo Geothermal Development Programme - Risk Mitigation Fund can be based to carry out more extensive exploration (including drilling). Development of the geothermal resource at Alid would contribute to energy security in Eritrea and thus also to the project's development objective of *improving the quality and adequacy of the electricity supply*.

IV. Consistency with Interim Strategy Note (ISN)

26. The project is consistent with the objective of the ISN FY08-FY10 which is to further focus Bank support to deliver improved human development and infrastructure services. The ISN outlines in its lessons learned that the Bank needs to focus its program in sectors where it has a good track record and good working relationship with implementing agencies. The Bank's relationship with the MEM and with the implementing agency EEC is excellent.

27. *Government Letter of Sector Policy*. MEM has updated its Letter of Sector Policy in March 2008 (Annex 2) that reaffirms its vision to ensure EEC's financial sustainability in the longer term and outlines near term measures to achieve that objective. In its Letter, the Government also reaffirms its commitment to developing renewable energy resources, rehabilitating generation plants and promoting community and private sector participation in rural energy service delivery.

28. *Mainstreaming HIV/AIDS in EEC Workplace*. An objective of the ISN is to "reduce incidence of communicative disease and improve reproductive health care". The project is consistent with this objective and with goals of the HIV/AIDS/STI, TB, Malaria and Reproductive Health Project (HAMSET) that is Bank supported. EEC has collaborated with the Ministry of Health to target over 1,100 staff in its HIV work place program. The main HIV workplace interventions taking place in EEC include information sharing, counseling and promoting behavior change among staff members. From the year 2008 onwards EEC plans to expand the HIV mainstreaming activities to cover both: (i) the currently ongoing internal HIV mainstreaming activities targeting the EEC employees; and (ii) external HIV mainstreaming activities targeting the customers, relatives and friends who interact with EEC employees (Annex 8 for detailed description of activities).

V. Economic and Financial Analysis

29. The economic and financial analysis of the restructured project with additional finance has been updated (Annex 4: Economic and Financial Analysis). The methodology used to carry out the economic and financial analysis update is similar to that of the original project.

Economic Analysis

30. The economic benefit of the *Asmara Distribution Rehabilitation and Expansion Component* with additional financing has increased compared to the original project from 18 percent to 20 percent IRR. The reasons for the increased economic benefit of the project with Additional Financing are provided below:

- (a) Due to the increase in the initial years demand (from 132 GWh in 2004 when the project was originally to commence to 145 GWh in 2007 when it actually commenced) resulting in an increase in initial benefits, this component yields higher economic benefit.
- (b) During the appraisal of the main project, the cost of crude oil on average was assumed to be about US\$ 30 per barrel (bbl) in the base case analysis. The sensitivity analysis of economic benefits in relation to crude oil prices showed that with increase in oil prices, consumer's economic benefit due to the project increases.

31. The economic net present benefit of the Power Plant Rehabilitation Component comes to about US\$ 4 million at 12 percent discount rate and the economic rate of return is about 27 percent.

32. Total cost of rehabilitation for the major three power plants is calculated to be about US\$ 13 million. It is expected that with successful renovation, EEC will be able to reduce the power plants forced outages and increase its generation significantly. EEC's average cost of generation is calculated to measure the cost of this increased electricity. According to the survey conducted in 2006, households spend a total of NFA 188 per month on lighting (NFA 103 for kerosene, candles and batteries and NFA 85 for electricity). Comparing this cost with average urban household expenditure for electricity bill of NFA 170 per month shows a consumer surplus of NFA 18 per month with any outage. This is a conservative estimate of consumer surplus as it only measures the surplus of domestic consumers and does not take into account the consumer surplus of commercial and industrial consumers, whose consumer surplus would be much higher compared to households as they will have direct loss of productivity and income due to poor quality of electricity supply.

Financial Analysis

33. The financial rate of return in the *Asmara Distribution Rehabilitation and Expansion Component* with additional financing has been reduced from 10 percent to 7 percent.

34. EEC's electricity generation is totally liquid fuel based. Hence its cost of production is directly related to the international oil market. Since 2004, the cost of petroleum has experienced a steady increase. From US\$ 30/bbl in 2004, the average crude oil price in 2007 was US\$ 71/bbl. To cope with this increase EEC has increased its electricity tariff in 2004 by 15 percent, in 2005 by 24 percent, in 2006 by 10 percent, reaching an average billing rate of NFA 2.39 per kilowatt hour (kWh) or about 15 cents/kWh in 2008 before a tariff increase in May 2008. At the current level of tariff, EEC is unable to meet its operating costs.

EEC's Projected Financial Performance:

35. The Government envisages that financial sustainability of EEC will be achieved in a phased manner – in the first phase it should achieve a positive cash operating status and over time it should meet all its obligations including debt services. A number of actions are available to the Government to set EEC on this path. They include:

- Billing its domestic consumers in Massawa and Assab at the same level of its domestic consumers in other areas from March 2008 onwards.
- Continue with the financial restructuring of EEC by delaying the transfer of the Hirgigo loan to EEC by another four years, i.e. until such time that EEC's sales increase up to

level where it will be able to service the loan of Hirgigo. Starting in 2012 the government may start to return 10 percent of the Hirgigo loan to EEC per annum.

- Equalize Exchange rate to official rate for fuel purchase. The official rate of NFA/US\$ is 15.75 in 2007. However, when EEC purchases fuel diesel oil and HFO to operate its generation plants (from Eritrea Petroleum Corporation), it is charged using an exchange rate of 18 NFA/US\$. This increases EEC's fuel cost significantly. If the exchange rate for EEC to purchase fuel is equalized to the official rate, then EEC's fuel cost would reduce significantly from its current level.
- Curtail use of costly generation plants to supply electricity in the isolated grid areas. EEC's generation cost of the isolated plants are very high and its own calculation shows that the current EEC tariff does not allow EEC to recover its fuel cost for those areas, let alone, labor, depreciation, financial charges and other costs. Hence, either government may allow a different tariff structure for EEC to supply electricity to those areas, or provide a direct and transparent subsidy to continue electricity supply to those areas, or to ration supply (as it is currently doing) to some a few hours per day to reduce EEC's costs.
- Be selective in deciding EEC's investment Program. Given the current performance level of EEC, Government and EEC should be very selective in deciding its investment program. They should select only those investment choices which will ensure positive economic and financial returns. If government insists that EEC undertake projects that have long term social gains but negative financial return, then government should also provide financial assistance to EEC to operate those projects.
- Increase EEC's Tariff. EEC's current tariff of 2007 is NFA 2.48/kWh, equivalent to US Cents 15.72/kWh. In 2007, EEC's Net Loss was about NFA 64 million. In order to cover this loss only by increasing EEC's tariff, it would have to be increased by 20 percent to a level of NFA 2.97/kWh or US Cents 18.85/kWh. In May 2008, the Government increased tariffs by 10 percent across all categories of customers.

36. By delaying the transfer to EEC of the debt incurred in construction of the Hirgigo generation plant until 2012, equalizing exchange rate for purchasing fuel, and increasing the tariff by 10 percent in each of three years (2008 to 2010) EEC would start to earn a positive return and contribute to its investment program starting from its fiscal year 2010 (i.e. from January 1, 2010). Its Debt Service Coverage Ratio would exceed 1.3 from 2010 onwards.

Financial Performance of EEC	Actual			Forecast					
	2004	2005	2006	2007	2008	2009	2010	2011	2012
Return on Equity (percent)	-2	2	-6	-4	-1	23	38	34	32
Return on Assets (percent)	-1.1	-5.8	-4.9	-5.0	-3.7	0.1	1.2	0.9	0.8
Operating Ratio	1.03	0.98	1.05	1.03	1.00	0.89	0.83	0.84	0.85
Accounts Receivable (days)	105.85	90.12	95.49	88.95	60.00	60.00	60.00	60.00	60.00
Current Ratio	0.66	1.86	2.16	3.52	1.59	1.85	2.02	2.06	2.14
Debt:Debt & Equity Ratio (percent)	0.47	0.65	0.67	0.72	0.77	0.83	0.83	0.82	0.82
Debt Service Coverage Ratio	1.16	1.64	1.67	2.92	0.58	1.05	1.46	1.58	1.60
Self Financing Ratio (percent)	-ev SF	-ev SF	15	143	38	4	27	80	78

VI. Appraisal of Restructured and New Project Activity

37. There is no change to the scope of Part A: *Rehabilitation and Expansion of Urban Electricity Distribution in Asmara* of the project for which additional financing of US\$4.5 million is proposed.

38. Proposed new component *Part F: Rehabilitation of Generation Plants*. The benefits of the rehabilitation of the distribution system (Asmara component) can only be realized if electricity supply security is ensured i.e. if key generation plants that serve Asmara are rehabilitated. In contrast with some two dozen countries in sub Saharan Africa facing acute power crisis, Eritrea has managed to date to maintain electricity supply with its oil based generation plants and stay out of crisis. Proposed support for rehabilitating the plants is critical for Eritrea to avert a power crisis and complements the on-going rehabilitation of the Asmara distribution system. The generating units at the main plant (Hirgigo), which accounts for about 80 percent of the generating capacity in the interconnected system, were installed in 1998 and 2000. The older smaller plants at Beleza and Assab also require rehabilitation. As per standard international practice and industry standards, they will require major overhaul between now and end 2009. Some units already have exceeded their scheduled overhaul dates and the rest will exceed them in the coming months. Delaying plant rehabilitation would cause the plants to fail, leading to brownouts and blackouts beginning in 2009 and eventually a system collapse after two to three years. Delay would also increase the cost of carrying out rehabilitation later as more components would require replacement. Rehabilitation of plants can be completed over a twelve month ending in October 2009 and will enable EEC to meet current and anticipated electricity demand growth over the next three years or more.

39. While well operated power companies finance the rehabilitation of their generation plants from internal funds, EEC cannot do so as its revenues have been insufficient to meet its operating expenses since 2006 when international fuel prices began to rise (more than 70 percent of its costs are for fuel purchases). If oil prices had remained at their pre-2006 levels EEC would have been able to carry out the rehabilitation from its internal resources.

40. Hirgigo generation plant. All four gensets with MAN B&W 12K60MC-S engines and ABB alternators rated 22 MW are operating on Heavy Fuel Oil (HFO) at reasonable average load (between 70 percent and 76 percent). In March 2008, DGU1 has exceeded 24,000 hours overhaul time by more than 1,500 hours and the DGU4 16,000 hours overhaul is overdue for more than 2,000 hours. The two other gensets will reach 24,000 hours overhaul during 2008.

41. Beleza. Beleza power plant has three Wärtsilä Vasa 64 Diesel engines with a rated capacity of 5.7 MW operating on Heavy Fuel Oil (HFO). In March 2008, due to the technical conditions of the engines (overdue maintenance due to lack of spare parts) the maximum load on the engine cannot exceed 4.9 MW and the engines are normally operated around 4.5 MW. All cylinder heads are facing significant cavitation problems in the exhaust valve seats cooling water area. Therefore all the cylinder heads need to be replaced or repaired. The Beleza plant is operating mainly as peak shaving plant and to cover low load phases in which the load is too low to run two engines in Hirgigo. Beleza is required to restart Hirgigo power plant after a black-out.

42. Assab. The Assab power plant is an isolated generation plant supplying about 10,000 customers through a local network in the Assab town and environs. The plant is equipped with two Wartsila diesel engines with a capacity of 2000 kW each, erected in 1993 and seven Mirrlees Blackstone diesel engines of 680kW each erected during the year 1988. All engines run on light diesel fuel.

43. EEC's capacity to implement the rehabilitation and overhaul of the generation plants was assessed during appraisal. It was found to be good for all the work required with the exception of the digital control system at Hirgigo. Replacement of the digital control system will require that its manufacturer carry out the work. Appraisal confirmed that EEC has been carrying out routine maintenance as specified by the manufacturer of the generation plants.

Safeguards.

44. The proposed new activity (*Part F: Rehabilitation of Generation Plants*) does not change the environmental category of the project or trigger new safeguard policies. The project remains category B and the existing mitigation instruments of the Environmental and Social Management and Monitoring Plan (ESMMP) and Resettlement Policy Framework (RPF) are adequate to cover all the activities financed under the additional financing. Potential environmental impacts linked to the proposed new activity are oil spillage and fire hazard. A short addendum to the ESMMP was disclosed in the Infoshop on March 11, 2008 prior to appraisal to describe the potential impacts and mitigation measures. No additional risks were identified during appraisal and procedures with fuel storage & handling facilities, cooling water systems, plant waste water and oily water disposal systems, monitoring indicators, and fire protection were confirmed to conform to industry norms.

45. *Rehabilitation and Expansion of Urban Electricity Distribution in Asmara.* Construction of works in this component commenced in January 2008. The provisions of the ESMMP to mitigate the impacts of this component were confirmed during appraisal of additional financing. These provisions include radio announcements and newspaper articles to inform electricity consumers of aspects of the project affecting them including voltage conversion that will necessitate adjustment to motors, temporary road closure during trenching, etc. Shops and residents will be protected from dust and debris through the use of dust sheets and water spray and temporary access to buildings facilitated by means of temporary ramps during trenching. If any shop (including street vendors) is forced to shut temporarily the project will be responsible to pay compensation as per the Resettlement Policy Framework.

Bank Policies

46. The restructuring does not involve any exceptions to Bank policies.

Financial Management and Disbursement

47. Ongoing standard disbursement arrangements will apply to ongoing components and to the proposed component *Rehabilitation of the generation plants* at Hirgigo, Bezeza and Assab and additional technical advisory services envisaged to implement and supervise this component. The revised Disbursement Schedule is shown in Annex 2.

48. Financial management review of the Project was last carried out in February 2008. The review covered project accounting and reporting arrangements, internal control procedures, planning and budgeting, counterpart funding, funds flow management, external audit reporting arrangements and project accounting staff issues. The Financial Management rating for the Project was rated Moderately Satisfactory (MS) at appraisal of additional financing. The corresponding FM Risk Rating is Substantial (S). The FM arrangements are adequate and continue to provide reasonable assurance that Bank funds are being used for the intended purposes.

49. The accounting information system in EEC has major weaknesses that are being remedied under the project. A financial specialist consultant financed under the project is assisting EEC to procure and implement a modern accounting system that will interface with a new billing system that will also be procured, installed and made operational as part of the project. An implementation plan has been prepared that should ensure that the new billing and accounting system is made operational by October 2009.

50. EEC does not have approved financial procedures manual. A draft financial manual has been prepared that will be approved by the Bank and be implemented by December 2008.

51. The inventory control system in EEC needs to be strengthened. A computerized stock management system will be implemented as part of the upgrading program of the EEC's MIS. The system should preferably network the major stores to the headquarters and be integrated to the accounting system and will be implemented by October 2009.

52. The two agencies MEM and EEC will from 2008 onwards submit Interim Financial Reports (IFRs) from the date of approval of the additional financing. The changeover from SOE to report-based disbursement method will take effect from January 2009.

Procurement

53. At the country level, Procurement risk is rated as *Moderate* (c.f. Section VIII). The country does not still have updated procurement systems and procedures in line with international acceptable practices; the institutional capacity is weak; and public procurement of goods has been centralized, which affects open competition and efficiency. The capacity of the public sector in procurement planning, execution and in contract management is weak due to lack of experienced technical staff in procurement and management. The capacity of the private sector (construction, manufacturing, supplies and consulting services) is low. However, despite the country level difficulties outlined above, MEM and EEC have so far managed project procurement satisfactorily as evidenced by contracts carried out so far. MEM and EEC follow World Bank Procurement Guidelines, use adequately prepared procurement plans and to the extent possible take appropriate action in case of poor or slow progress. MEM and EEC staff are committed to efficiency, have capacity to supervise contracts and to identify cases requiring external technical assistance. There have been no cases suspected to be involving corruption or such other irregularities. At the project level Procurement residual risk is rated as *Moderate*. See also Annex 3 – Procurement Arrangements.

VII. Expected Outcomes

54. The project outcome targets have been updated consistent with its restructured objectives. By project closing the project targets are:

- 70 percent of total population in 59 rural towns & villages have electricity service
- System losses in Asmara are reduced to 7 percent of electricity supplied
- Generation plants (Hirgigo, Beleza and Assab) achieve 90 percent capacity utilization rate or better (defined for the purposes of the project as the ratio of the generation plants' operating capacity (i.e. capacity available for dispatch) and their installed (nameplate) capacity.

- EEC achieves a self financing ratio (SFR) that is positive.
- Billing and accounting methods in EEC conform to international good practice to be measured by efficiency indicators including bill accuracy, number of customer complaints, and time taken to process bills.
- Electricity Regulatory Committee (ERC) will have issued written regulatory order/directives.

VIII. Benefits and Risks

55. Overall risk rating is *High* compared to *Substantial* at appraisal on account of a combination of changed country and project specific risks. The Project related risks include implementation capacity whereas the country specific risks include (a) regional instability arising from the failure of the State of Eritrea and Republic of Ethiopia to resolve the border conflict, (b) the macro-economic framework which leaves the economy vulnerable to crises, and (c) shortage of foreign exchange supplies.

56. Project risks are rated High due to implementation capacity in EEC and potential delay in finalizing engineering designs for the investment component in the Asmara contract. These risks are mitigated by consultant services (owner's engineer) to assist EEC supervise the contractor in the Asmara component. At the project level (MEM and EEC) governance risks are rated Average. There is strong government ownership of the project. With regard to the project specific risks arising from the High procurement risks, the Bank will increase procurement training among staff involved in project implementation. Also, analytic work on public financial management (PFM) in Eritrea is not available. In addressing this weakness, the Bank will be ready to offer support for technical assistance, analytical work, and capacity building to improve public financial management and procurement practices while ensuring satisfactory fiduciary practices in Bank-financed projects through project-specific.

57. Failure to make progress in demarcating the Ethiopia-Eritrea border has resulted in increased tension and potential volatility, contributing to regional instability in the Horn of Africa as well as economic fragility in Eritrea. As such, the whole Eritrea portfolio, including this project, faces *High* risks of regional instability. In addressing this risk, the Bank will continue to express support for resolution by peaceful means and in the context of the Algiers Peace Agreement. If instability becomes severe, the Bank will work with other partners to identify a collective response. It will scale back or suspend financial assistance, if the situation warrants. If the situation improves, the Bank should be prepared to enhance its support.

58. Another portfolio-wide risk rated *High* results from the overall weak macro-economic framework. The management of the fiscal and trade deficits through price controls and regulations leave the economy vulnerable to economic crisis. This could result in high or hyper-inflation and/or debt default. In mitigating this risk, the Bank will pursue dialogue on revenue/expenditure and debt management, largely in the context of the Article IV missions. It will be vigilant for potential entry points and will work with other donors that have made capacity building central to their program of support, such as EC, to identify the potential for Bank assistance.

59. High oil prices are a risk to EEC regaining financial sustainability as fuel oil for electricity generation account for more than 70 percent of its costs. This *High* risk is mitigated by the commitment of the Ministry of Energy and Mines to ensure EEC's financial sustainability in the

longer term and to implement near-term measures such as implementing a disconnection policy for non-payment, increasing average tariffs (the most recent tariff increase was in May 2008 that raised tariffs by 10 percent on average), restricted use of costly diesel engines that supply electricity in small towns and debt restructuring. It is committed to goal of EEC meeting performance requirements in accordance with commercial practice. To this end, it intends to introduce a regulatory system for the sector in a phased manner. The project will ensure reliable supply of electricity in Asmara and throughout the country with positive impact on households and businesses. High technical losses in electricity distribution due to antiquated infrastructure will be reduced with positive impact on EEC's financial sustainability.

IX. Financial Terms and Conditions for Additional Financing

60. Standard IDA grant terms would apply to the additional financing.

Annex 1: Revised Project Costs and Financing Plan

Table 1: Revised Project Costs

Project cost by component	Local US\$ million	Foreign US\$ million	Total US\$ million
Asmara distribution rehabilitation	2.66	37.34	40.00
Rural Electrification	2.93	12.27	15.20
Rural Electrification Fund	0.00	0.00	0.00
Sector reform & institutional	0.29	4.05	4.34
Environmental monitoring	0.24	0.19	0.43
Generation plant rehabilitation	0.30	13.00	13.30
Total baseline cost	6.42	66.85	73.27
Physical Contingencies	0.46	1.05	1.51
Price Contingencies	1.71	1.47	3.18
Total Project Cost	8.6	69.4	78.0
Project cost by category	Local US\$ million	Foreign US\$ million	Total US\$ million
Supply and Installation Works	7.67	48.05	55.72
Goods	0.34	14.35	14.69
Consulting Services	0.35	6.29	6.65
Training	0.07	0.64	0.72
Incremental operating costs	0.07	0.00	0.07
Environmental Compensation	0.08	0.00	0.08
Total project cost	8.6	69.4	78.0

Table 2: Original Project Costs

Project cost by component	Local US\$ million	Foreign US\$ million	Total US\$ million
rehabilitation			
Rural Electrification	2.90	10.87	13.77
Rural Electrification Fund	0.00	1.41	1.41
Sector reform & institutional	0.29	4.05	4.34
Environmental monitoring	0.24	0.19	0.43
Total baseline cost	5.40	44.10	49.50
Physical Contingencies	0.41	4.09	4.50
Price Contingencies	1.56	1.59	3.15
Total Project Cost	7.4	49.8	57.2

Project cost by category	Local US\$ million	Foreign US\$ million	Total US\$ million
Supply and Installation	6.75	40.22	46.97
Works			
Goods	0.04	1.65	1.69
Consulting Services	0.35	5.82	6.17
Training	0.07	0.64	0.72
Incremental operating costs	0.07	0.00	0.07
RE fund	0.00	1.41	1.41
Environmental Compensation	0.08	0.00	0.08
Total project cost	7.4	49.7	57.1

TOTAL AMOUNT	20,000,000	14,500,000	14,500,000	10,800,000	
Category	Credit Allocated (expressed in SDR)	Original Grant Allocated (expressed in SDR)	Revised Amounts of Original Grant (expressed in SDR)	Additional Grant (expressed in SDR)	Percentage of Expenditures to be Financed (inclusive of Taxes)
(1) Works	10,000				100 percent of foreign expenditures and 85 percent of local expenditures
(2) Supply and Installation	17,350,000	6,900,000	7,870,000	3,000,000	100 percent of foreign expenditures and 85 percent of local expenditure
(a) for Part A	17,350,000		970,000	2,800,000	
(b) for Part B (c) for Part F		6,900,000	6,900,000	200,000	
(3) Goods		1,060,000	1,060,000	7,800,000	100 percent of foreign expenditures and 85 percent of local expenditure
(a) for Part D.2		1,030,000	1,030,000		
(b) for Part D.1, D.3 and E		30,000	30,000		
(c) for Part F				7,800,000	
(4) Consultants' Services and Audits		2,920,000	2,920,000		100 percent of foreign expenditures and 85 percent of local expenditure
(a) for Part A		1,340,000	1,340,000		
(b) for Part B		430,000	430,000		
(c) for Part D.1		620,000	620,000		
(d) for Part D.2		380,000	380,000		
(e) for Part D.3		90,000	90,000		
(f) for Part F		60,000	60,000		
(5) Training and Workshops		490,000	490,000		100 percent
(a) For Part D.2 (b) For Part D.1, D.3, and E		280,000 210,000	280,000 210,000		
6) Subgrants under Part C of the Project		970,000			100 percent of the amount disbursed
(7) Operating Costs		50,000	50,000		85 percent
(8) Refunding of Project Preparation Advance		690,000	690,000		Section 2.02 (c) of the Original Agreement
(9) Unallocated	2,640,000	1,420,000	1,420,000		

Annex 2: Revised Allocation of Credit and Grant Proceeds by Category and By Component

Annex 3. Procurement Arrangements

1. **Introduction:** This Annex is an update of the “Annex 6(A): Procurement Arrangements” of the Project Appraisal Document of the Asmara Power Distribution and Rural Electrification Project, prepared in June 2004. This Annex provides additional information and addresses emerging issues on procurement implementation for the project as it relates to ongoing and proposed extension activities.

2. **Procurement risks:** The Country Procurement environment remains the same as it was during appraisal of the project in 2004. At the country level, governance risks, of which Procurement is a subset, is rated as High. The country does not still have updated procurement systems and procedures in line with international acceptable practices; the institutional capacity is weak; and public procurement of goods has been centralized, which affects open competition and efficiency. The capacity of the public sector in procurement planning, execution and in contract management is weak due to lack of experienced technical staff in procurement and management. The capacity of the private sector (construction, manufacturing, supplies and consulting services) is low. Because of the prevailing political situation, competition by foreign bidders is also low. However the situation has been made worse by shortages of fuel and deregistration of local contractors. However, despite the country level difficulties outlined above, MEM and EEC have so far managed project procurement satisfactorily as indicated below and evidenced by contracts carried out so far. MEM and EEC follow World Bank Procurement Guidelines, use adequately prepared procurement plans and to the extent possible take appropriate action in case of poor or slow progress. The case of taking appropriate action is evidenced by the way EEC handled and resolved the difficulties on the complex contract for Asmara Power Distribution and Rehabilitation. MEM and EEC staff are committed to efficiency, have capacity to supervise contracts and to identify cases requiring external technical assistance. There have been no cases suspected to be involving corruption or such other irregularities. At project level (MEM and EEC) governance risks, of which Procurement is a subset, is rated as Average.

3. **Progress made on procurement and signs for the future:** Overall the assessment of procurement implementation under the project shows a positive situation and encouraging results. All five (5) Technical Assistance/consulting contracts on the Projects Procurement Plan to be implemented by MEM¹ have been implemented except for one contract (design of the Rural Electrification Fund Operational Manual) which is progressing satisfactorily and will be completed by June 2008. Of the four (4) Technical Assistance/consulting contracts on the Projects Procurement Plan to be implemented by EEC², only one contract has not been completed, that is the MIS design and supervision. In this case, the consultant was successfully selected, signed and started the contract but has failed to complete the MIS bidding documents. The contract for rural electrification (distribution) by Siemens will be completed by end April, 2008. Implementation of Asmara Power Rehabilitation and Distribution is underway in March

¹ The Technical Assistance/consulting contracts implemented by MEM as per their Procurement Plan are (1) Power Sector Reforms, (2) Tariff Study Update, (3) Design of ER Fund, (4) Setting regulatory function, and (5) Appointment of a Training Coordinator.

² The Technical Assistance/consulting contracts implemented by EEC as per their Procurement Plan are (1) Financial Adviser to reform EEC accounting systems, (2) MIS design and implementation, (3) Corporate planning for EECs, and (4) Institutional strengthening for EEC.

2008³, although it is more than one year behind schedule due to delay in finalizing the technical design. EEC and ABB have agreed on a revised work schedule that indicates completion by November 2009.

4. **Mitigating procurement Risks:** Risk mitigation is addressed at the project level. Because of the (i) low capacity of the local contractors (including deregistration of local contractors) and suppliers, and (ii) low competition by foreign bidders for procurement of civil works and goods, the project depends and will continue to depend on foreign contractors working in association with local contractors and suppliers. For Consulting services, the low capacity of public and private sectors will continue to be overcome by employing international firms to carry out planning, design and procurement implementation. The project will to the extent possible apply extensions of existing contracts and use LIB procedures.

5. **Scope of procurement:** The major contracts envisaged under the current and extended contract are listed below and are on the attached procurement plan.

- (i) **The completion of the Asmara Power Rehabilitation and Distribution:** The work is ongoing. Any required amendments to the scope of the contract will be by way of a negotiated amendment, subject to Bank clearance if the amendment exceeds 15 percent above the contract price. So far, the major amendment is resulting from change of wooden poles to steel, which is being discussed between contractor and EEC.
- (ii) **Supervision services for Asmara Power Rehabilitation and Distribution contract** will continue to be provided by BP Power Consultants as per current contract. Any required amendments to the scope of the contract will be by way of a negotiated amendment, subject to Bank clearance if the amendment exceeds 15 percent above the contract price.
- (iii) **The MIS design and supervision:** This contract was delayed due to poor coordination and changes to the scope that became evident during its identification phase. EEC has now defined the scope of the MIS that it wishes to procure. The redefined scope focuses on the billing and accounting system. A revised implementation plan that is acceptable to the Bank has been prepared that envisages completion of this component i.e. installation and operationalizing a modern billing and accounting system in EEC by October '09. The procurement of the MIS will include ICB, NCB and shopping methods. Domestic preference will be given to the procurement of hardware components of the MIS in order to better ensure project sustainability through the participation of local equipment suppliers.
- (iv) **Rehabilitation of Generating plants:** A consultant has carried out an assessment of the generation plants and will assist EEC to prepare a rehabilitation plan and will be responsible for supervision and certification of rehabilitation of the generating plants. This consultant has been selected on CQ basis from a shortlist of 6 qualified consultants. **Proprietary spare parts** for the rehabilitation of the Generating plants will be procured by direct contract with manufacturers. **General spare parts** will be procured by ICB, NCB or shopping as the case, depending on contract price. The actual rehabilitation (overhauling the plants) will be carried by EEC whose capacity has been assessed to be more than adequate based on their track record in maintaining the plants in excellent

³ At Appraisal of additional financing (March '08) civil works had started at the new substation at Asmara North and materials (cables, transformers and equipment, including heavy trucks) had been delivered to the site in Asmara.

condition. One element of the rehabilitation (replacement of the Data Control System) however will not be in EEC's competence to do. This will be done by the manufacturers of the DCS (by direct contract).

- (v) **Technical Assistance to MEM:** It is envisaged that the Ministry will require TA for various tasks to be identified during implementation. Selection will follow appropriate methods as described in the project document.
- (vi) The project will finance a feasibility study for Geothermal and Geological mapping to explore the possibility of geothermal power generation. This feasibility study will be linked to the greater African Rift Valley Geothermal Program. This is a specialized study that will be procured on basis of LIB, targeted to specialized firms in this kind of assignment.

6. In addition the above provisions, the procurement arrangements in the "Annex 6(A): Procurement Arrangements" of the Project Appraisal Document of the Asmara Power Distribution and Rural Electrification Project, prepared June 2004, have been modified as follows:

- (i) The Procurement arrangements in the 2004 Procurement Guidelines with corrigenda October 2006 will apply to all new procurement contracts, including those associated with activities funded under the original project.
- (ii) Procurement contracts and thresholds for methods and prior review are specified on the Procurement Plan and are summarized on Attachment 2 below. Any new contracts not on the Procurement plan or whose threshold is not on the Procurement plan will follow the thresholds on Attachment 1.
- (iii) The following methods specified in the original agreement will not apply for Selection of Consultants: Quality Based Selection and Selection Under a Fixed Budget. All sole source contracts will be subject to prior review.
- (iv) The frequency of procurement supervision is 6 months.

Thresholds for Procurement methods and prior review

Expenditure Category	Contract Value	Procurement Method	Contracts subject to Prior Review
Works and Supply and Installation	Above US\$ 500,000 US\$75,000-500,000 Below US\$75,000	ICB NCB Shopping	All None None
Goods	Above US\$ 250,000 US\$50,000- US\$250,000 Below US\$50,000	ICB NCB Shopping	All None None
Services Firms	Above US\$ 100,000 Below US\$100,000	QCBS CQ	All TOR only
Services Individuals	Above US\$ 50,000 Below US\$50,000	IC IC	All TOR only
Works and Supply and Installation, goods and services	All	Sole source or Direct	All

PROJECT COSTS BY PROCUREMENT ARRANGEMENTS

I. Goods, Works, and Non Consulting Services

(a) List of contract packages to be procured following ICB and direct contracting and other methods of contracting:

Contract Name	Part of Project	Estimated Cost	Proc. Method	Review by the Bank	RFP sent short list	Bid-Opening Date Appraisal	Bid-Opening Date Actual /Forecast	Contract Award Appraisal	Contract Award Actual/Forecast	Expected Completion Appraisal	Expected Completion Actual/Forecast
Asmara Power Distribution Rehabilitation	Part A	US\$31,067,750 (+US\$7.6 additional finance)	ICB	Done	Done	11/26/2004	01/31/2005 (A)	02/28/2005	11/02/2005 (A)	Mid-2008	End-2008
Rural Electrification (Keren, Barentu) Phase I	Part B	US\$6,202,720.44	ICB	Done	Done	09/30/2004	01/20/2005 (A)	01/14/2005	07/13/2005 (A)	Mid-2007	May 2008
Rural Electrification (Dekemhare, Adi Keih) Phase I	Part B	US\$5,228,179.58	ICB	Done	Done	09/30/2004	01/20/2005 (A)	01/14/2005	07/13/2005 (A)	Mid-2007	May 2008
M.I.S. for EEC	Part D2	US\$1.5 million	ICB, NCB Shopping	Yes	May '08	08/31/2005	August 2008		October '08	Mid-2006	November '09
Proprietary Parts for Generation Plants	Part F	US\$13.0 million	DC	Yes	NA	NA	NA	NA	August '08	NA	December '09
General Parts for Generation Plants	Part B	US\$50,000	Shopping	No	NA	NA	NA	NA	Continuous	NA	December '09
Rehabilitation of generation plants by manufacturer	Part B	US\$300,000	DC	Yes	NA	NA	NA	NA	August '08	NA	December '09

2. Consulting Services

(a) List of consulting assignments with short-list of international firms.

Contract Name	Part of Project	Estimated And Actual Costs	Proc. Method	Review by the Bank	RFP	Proposals Submission Date	Proposals Submission Date	Expected Completion	Expected Completion	Implementing agency
Asmara design & supervision consultant	Part A	UK £427,294 (Phase 1) UK £713,657 (Phase 2)	QCBS	Done	Done	Appraisal	Actual/Forecast	Appraisal	Actual/Forecast	EEC
RE design & supervision consultant	Part B	US\$248,918.99 Phase 1 and 524,579.41 Phase 2	QCBS	Done	Done	Jan. 15, 2005	2003 (A)	late 2007	2008	EEC
Information Technology Advisor for MIS	Part D2	US\$130,000	QCBS	Done	Done	Feb. 28, 2005	Jan. 2006	mid-2005	Mid 2007	EEC
Financial Advisor to EEC (Corporate planning and budgeting; separation of EEC accounts; EEC finance and accounts department strengthening; modern computerized billing and accounting)	Part D2	US\$400,000	QCBS/SS	Done/Extension to be reviewed	NA	Aug. 31, 2005	Sept. 30, 2005	2006	November '09	EEC
Power Plant Rehabilitation and Maintenance (Phase 1 appraisal)	Part F	US\$95,000	CQ	TOR review done	NA	NA	March 2008	April 2008	November '09	EEC
Power Plant Rehabilitation and Maintenance (Phase 2 supervision)	Part F	US\$95,000	CQ	Yes TOR only	NA	NA	August '08	NA	November '09	EEC
Surface exploration for Geothermal feasibility	Part D1	US\$400,000	LIB	Yes	June '09	NA	August '08	NA	November '09	MEM
Tariff study update	Part D1	US\$273,000	QCBS	Done	Done	Nov. 30, 2004	Mar. 9, 2005 (A)	late 2005	March 2007	MEM
Training coordinator for MEM	Part D3	US\$135,000	CQ	Done	Done	Feb. 15, 2005	Jan. 2006	end-2005	2008	MEM
Power sector reforms and setting up a regulatory function	Part D1	US\$412,000	QCBS	Done	Done	Feb. 28, 2005	August 2005	end-2005	Mid 2007	MEM
Design of RE Fund	Part D1	US\$218,000	QCBS	Done	Done	Jan. 15, 2005	Jan. 2006	mid-2005	May 2008	MEM
Consultancy services for implementation of RE Fund	Part D1	US\$150,000	IC	Yes	June '08	NA	August '08	NA	October 09	MEM

Contract Name	Part of Project	Estimated And Actual Costs	Proc. Method	Review by the Bank	RFP	Proposals Submission Date	Proposals Submission Date	Expected Completion	Expected Completion	Implementing agency
Consultancy services for implementation of Energy Regulatory Committee	Part D1	US\$150,000	IC	Yes	June '08	Appraisal	Actual/Forecast	Appraisal	Actual/Forecast	MEM

All costs in US\$ million equivalent except Asmara design & supervision consultant which is denominated in UK Pounds

Overall Residual Procurement Risk Assessment:

✓

High
Moderate
Low

Annex 4: Economic and Financial Analysis

1. The economic and financial analysis of the restructured project with additional finance has been updated. The methodology used to carry out the economic and financial analysis update is similar to that of the original project (c.f. Annex 4 of original project PAD).

Economic Analysis

Asmara Distribution Rehabilitation and Expansion Component:

Least-Cost Development:

2. The project design remains unchanged. The feasibility study for the rehabilitation of the Asmara distribution system identified the project design as the least-cost alternative to reinforce and expand power supply in Asmara and its vicinity. The additional financing to this component is for cost overrun due to (i) a variation order that will replace wooden poles with steel poles and (ii) price increase following application of automatic price escalation clauses in the contract (largely due to changes in international materials prices such as copper, aluminum and steel). Thus the additional financing of this component will only meet the additional cost of the project and is not anticipating any change in project design and scope. It will still remain the least-cost approach to renovate and rebuild Asmara's electricity distribution sector.

Cost-benefit analysis:

	Original Project	With Additional Financing
NPV @ 12 percent Discount Rate	US\$ 12 million	US\$ 32 million
IRR	18 percent	20 percent

3. The economic benefit of the project with additional financing has increased compared to the original project. The reasons for the increased economic benefit of the project with Additional Financing are provided below:

(a) There had been a delay in commencing the construction phase of this component. The component was expected to start in early 2005, while now it has started from 2007. The energy demand of Asmara in 2004 was 132 GWh and in 2007 was 145 GWh. Due to the increase in the initial years demand, resulting in an increase in initial benefits, this component with Additional Financing yields higher economic benefit.

(b) Asmara receives electricity from Hirgigo and Beleza power plants and these two plants generate the cheapest electricity in Eritrea. Meeting electricity demand from any other sources in Eritrea would be more expensive. During the appraisal of the main project, the cost of crude oil on average was assumed to be about US\$ 30/bbl in the base case analysis. The sensitivity analysis of economic benefits in relation to crude oil prices showed that with increase in oil prices, consumer's economic benefit due to the project increases. The updated economic analysis of the project with Additional Financing the benefits were calculated using average crude oil price US\$ 70/bbl for the base case. Hence the economic benefit of this component is much higher compared to the previous calculations at appraisal of the original project.

Power Plant Rehabilitation:

4. The two power plants that supply power to the integrated system (ICS) through 132 kV and 66 kV transmission lines are Hirgigo and Beleza power plants. The firm capacities of these power plants are 74.8 MW and 14.4 MW respectively. These plants will not reach the threshold in their operating hours when a major overhaul is due (according to their design specifications) to avoid risk of forced outages and more expensive rehabilitation in the future if the plants were operated without overhaul. The additional financing will finance a new component to rehabilitate these power plants. In addition to the power plants connected with ICS system, the Assab power plant will also be rehabilitated.

5. Total cost of rehabilitation for the major three power plants is calculated to be about US\$ 9 million. It is expected that with successful renovation, EEC will be able to reduce the power plants forced outages and increase its generation significantly. EEC's average cost of generation is calculated to measure the cost of this increased electricity.

Cost-benefit Analysis:

	Power Plant Rehabilitation
NPV @ 12 percent Discount Rate	US\$ 3.93 million
IRR	27 percent

6. According to the survey conducted in 2006, households spend a total of NFA 188 per month on lighting (NFA 103 for kerosene, candles and batteries and NFA 85 for electricity). Comparing this cost with average urban household expenditure for electricity bill of NFA 170 per month shows a consumer surplus of NFA 18 per month with any outage. This is a conservative estimate of consumer surplus as it only measures the surplus of domestic consumers and doesn't take into account the consumer surplus of commercial and industrial consumers, whose consumer surplus would be much higher compared to households as they will have direct loss of productivity and income due to poor quality of electricity supply.

7. Based on the above assumptions the economic net present benefit of the Power Plant Rehabilitation Component comes to about US\$ 4 million at 12 percent discount rate and the economic rate of return is about 27 percent.

Financial Analysis

Asmara Distribution Rehabilitation and Expansion Component:

Cost-benefit Analysis

	Original Project	With Additional Financing
NPV @ 12 percent Discount Rate	US\$ 4.5(-ve) million	US\$ 15.35 (-ve) million
IRR	10 percent	7 percent

8. EEC's electricity generation is totally liquid fuel based. Hence its cost of production is directly related to the international oil market. Since 2004, the cost of petroleum has experienced a steady increase. From US\$ 30/bbl in 2004, the average crude oil price in 2007 was US\$ 71/bbl. To cope with this increase EEC has increased its electricity tariff in 2004 by 15 percent, in 2005 by 24 percent and in 2006 by 10 percent, reaching an average billing rate of NFA 2.39/kWh (about 15 cents/kWh) in 2008. In 2006, Eritrea faced an economic downturn and EEC electricity sales dropped significantly. As several industries closed down, EEC lost its largest customers. Since then, to stimulate business development, Government has not increased the tariff after 2006. Consequently EEC's revenue gap has widened. At the current level of tariff, EEC is unable to meet its operating costs. Hence the project's financial rate of return with additional financing has reduced compared to the original project's financial rate of return.

Rural Electrification Component:

Cost-benefit Analysis:

	Original Project	With Additional Financing
NPV @ 12 percent Discount Rate	US\$ 1.5(-ve) million	US\$ 3.39 (-ve) million
IRR	7 percent	6 percent

9. The macro economic factors affecting the financial returns in the Asmara Distribution Rehabilitation and Expansion component have also affected the Rural Electrification component negatively. As a result, the project with additional financing has lower financial rate of return compared to the main project.

EEC's Projected Financial Performance:

10. In 2004 Government carried out a financial restructuring in EEC's capital structure by taking over 70 percent of EEC's debt for the Hirgigo Power Plant. Government took this responsibility because the energy demand of Eritrea, in 2004 didn't allow EEC to utilize more than 30 percent of its Hirgigo Power Plant capacity. This financial restructuring was done in 2004 assuming that by 2008 EEC's energy demand will increase and from 2008 onwards, Government will transfer back 10 percent of Hirgigo loans to EEC per annum. Unfortunately, since the Eritrea economy didn't perform as expected over the last couple of years, EEC's sales have not grown enough to take on this Hirgigo loan starting from 2008. If Government decides to transfer the Hirgigo Loan to EEC then its financial performance will further deteriorate.

11. According to the Bank's Credit Covenants, starting from 2006, EEC was to earn a positive return on assets, maintain at least 1.3 Debt Service Coverage Ratio, contribute to its investment program and maintain accounts receivable not more than 60 days of sales equivalent. Due to factors outside its control such as the steep increase in oil process and the downturn in the economy these targets are not achievable in the short run. Thus the Government now envisages that financial sustainability of EEC will be achieved in a phased manner. In a first phase, EEC should achieve a positive cash operating status and over time meet all its obligations including debt service.

Recommendations to Improve EEC's Financial Performance:

12. **Increase Domestic Tariff in Massawa and Assab.** A tariff study was carried out under the project and one of the recommendations was to increase the tariff of domestic consumers in Massawa and Assab to the same level of domestic consumers in other areas. The Government has informed the Bank that it intends to implement this recommendation and it is expected that EEC will start billing its domestic consumers in Massawa and Assab at the same level of its domestic consumers in other areas from March 2008 onwards. While the revenue impact of this action is not very significant, it will result in some increased revenue for EEC.

13. **Delay Loan Repayment for Hirgigo for another 4 years.** According to the financial restructuring carried out in 2004, Government should return 10 percent of Hirgigo Loans to EEC's balance sheet every year. This would increase EEC's debt repayment burden, while its sales have not increased significantly to be able to accommodate this increase in cost. Hence the government may continue with the financial restructuring by delaying the transfer of the Hirgigo loan to EEC by another four years i.e. until such time that EEC's sales increase up to level where it will be able to service the loan of Hirgigo. From 2012 the government may start to return 10 percent of Hirgigo loan to EEC per annum. This will give EEC some relief; however, this action alone will not enable EEC to reach a sustainable financial performance level.

14. **Equalize Exchange rate to official rate for fuel purchase.** The official rate of NFA/US\$ is 15.75 in 2007. However, when EEC purchases fuel diesel oil and HFO to operate its generation plants (from Eritrea Petroleum Corporation), it is charged using an exchange rate of 18 NFA/US\$. This increases EEC's fuel cost significantly. If the exchange rate for EEC to purchase fuel is equalized to the official rate, then EEC's fuel cost would reduce significantly from its current level.

15. **Ration supply in the isolated grid areas.** EEC's generation cost of the isolated plants are very high and its own calculation shows that the current EEC tariff doesn't even allow EEC to recover its fuel cost for those areas, let alone, labor, depreciation, financial charges and other costs. Hence, either government may allow a different tariff structure for EEC to supply electricity to those areas, or provide a direct and transparent subsidy to continue electricity supply to those areas, or to ration supply (as it is currently doing) to some a few hours per day to reduce EEC's costs.

16. **Be selective in deciding EEC's investment Program.** Given the current performance level of EEC, Government and EEC should be very selective in deciding its investment program. They should select only those investment choices which will ensure positive economic and financial returns. If government insists for EEC to take on projects that has long term social gains but negative financial return, then government should also provide financial assistance to EEC to operate those projects.

17. **Increase EEC's Tariff.** EEC's current tariff of 2007 is NFA 2.48/kWh, equivalent to US Cents 15.72/kWh. In 2007 EEC's Net Loss was about NFA 64 million. In order to cover this loss only by increasing EEC's tariff, it would have to be increased by 20 percent to a level of NFA 2.97/kWh or US Cents 18.85/kWh.

18. The cumulative impact of some of the above recommendations on EEC's financial performance is provided below.

Definition and cumulative impact of each scenario:

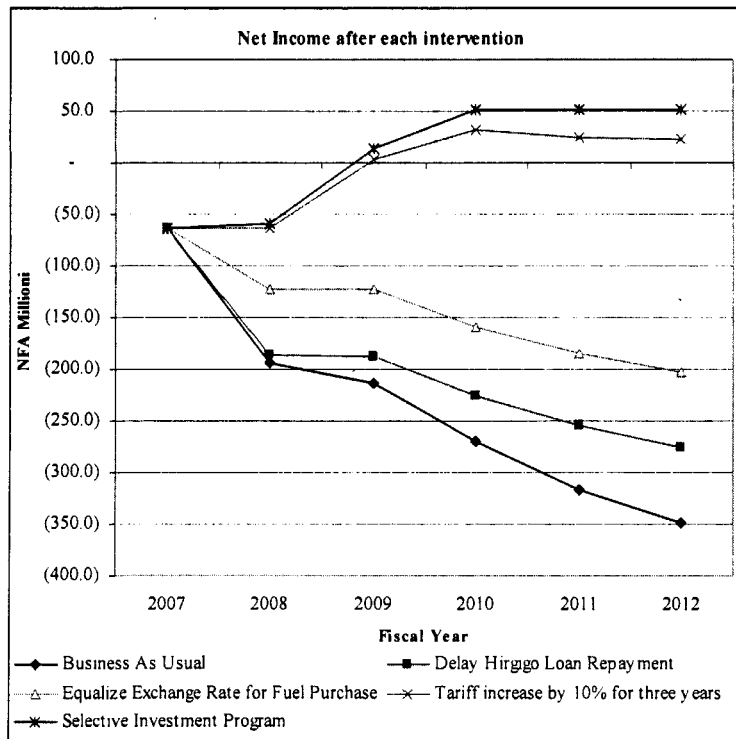
19. **Business as Usual.** This scenario refers to no change in EEC's business practices from 2007 level till 2012. In this scenario, EEC's financial performance continues to deteriorate and EEC's operation becomes unsustainable. Its Net Loss increases to about NFA 200 million in 2008 and further increases to about NFA 350 million by 2012.

20. **Delay Hirigigo Loan Repayment.** In this scenario EEC's cost would reduce by the loan repayment amount of the 10 percent of Hirigigo loans and associated interest payments. However, EEC's Net Loss still remains high at about NFA 186 million in 2008 and about NFA 276 million in 2012.

21. **Equalize Exchange Rate for Fuel Purchase.** By implementing this recommendation EEC would reduce its Net Loss in 2008 to about NFA 122 million and it remains at NFA 200 million in 2012. Tariff requirement to earn a positive return remains at about NFA 3.2/kWh level.

22. **Tariff increase by 10 percent for three years.** Only after this intervention would EEC start to earn a positive return from 2009 onwards. Tariff level would need to be around NFA 3.2/kWh to ensure a positive return.

23. **Selective Investment Program.** By being selective in its investment program, EEC can enhance its financial performance. In this scenario, only by delaying EEC's investment program by 1-2 years, could EEC improve its performance significantly.



Financial Performance Indicators of EEC:

24. By delaying loan repayment for Hirigigo till 2012, equalizing exchange rate for purchasing fuel, and increasing the tariff by 10 percent in each of three years (2008 to 2010) EEC would start to earn a positive return and contribute to its investment program starting from 2009. Its Debt Service Coverage Ratio would exceed 1.3 from 2010 onwards.

Financial Performance of EEC	Actual			Forecast					
	2004	2005	2006	2007	2008	2009	2010	2011	2012
Return on Equity (percent)	-2	2	-6	-4	-1	23	38	34	32
Return on Assets (percent)	-1.1	-5.8	-4.9	-5.0	-3.7	0.1	1.2	0.9	0.8
Operating Ratio	1.03	0.98	1.05	1.03	1.00	0.89	0.83	0.84	0.85
Accounts Receivable (days)	105.85	90.12	95.49	88.95	60.00	60.00	60.00	60.00	60.00
Current Ratio	0.66	1.86	2.16	3.52	1.59	1.85	2.02	2.06	2.14
Debt:Debt & Equity Ratio (percent)	0.47	0.65	0.67	0.72	0.77	0.83	0.83	0.82	0.82
Debt Service Coverage Ratio	1.16	1.64	1.67	2.92	0.58	1.05	1.46	1.58	1.60
Self Financing Ratio (percent)	-ev SF	-ev SF	15	143	38	4	27	80	78

Annex 5: RESULTS FRAMEWORK (Revised)

Project Development Objectives:	Key Performance Indicators / Impact Indicators:	Baseline (2004)	Progress to date (May 2008)	Target Values (June 2010)	Reporting Instruments and Responsibility
(i) Expanded electricity access in rural areas	Household electricity access (the proportion of the total population in the 59 rural towns and villages in the project areas that are provided with grid electricity service).	0 percent of total population in 59 towns & villages have grid electricity service.	Extension of MV and LV networks in 59 towns and villages has been completed.	70 percent of total population in 59 towns & villages have grid electricity service.	Progress reports (EEEC) Impact evaluation report (MEM)
	System losses in the Asmara service area as a percentage of electricity supplied	System losses in the Asmara service area are 18 percent.	The contract for the Asmara component became effective in February 2007. 100 percent of MV design and 30 percent of LV design is complete and construction has commenced at the new substation at Asmara North.	System losses in Asmara are reduced to 7 percent of electricity supplied.	
(ii) Improved quality and adequacy of the electricity supply	Capacity utilization (operating capacity/installed capacity) and forced outage duration of the generation plants at Hirigigo, Beleza and Assab.	Generating plant will be at high risk of forced outage if scheduled rehabilitation and overhaul is not undertaken during 2008 and 2009.	The appraisal of the rehabilitation work to be carried out at the generation plants has been completed. The capacity of EEC to implement the work has been appraised to be good.	Generation plants at Hirigigo, Beleza and Assab achieve 90 capacity utilization rate (defined as the ratio of the generation plants' operating capacity (i.e. capacity available for dispatch) and their installed (nameplate) capacity.	Progress reports (EEEC)
	EEC achieves positive cash operating situation and over time progresses to meeting a portion of its investment needs measured by key financial indicators: return on assets (ROA), debt service coverage ratio (DSCR), and self financing ratio (SFR).	ROA: negative DSCR: less than 1 SFR: negative	ROA: negative DSCR: less than 1.0 SFR: positive (positive cash operating status)	ROA: positive DSCR: 1.0 or greater SFR: positive	Progress reports (EEEC)
(iii) Regulatory and institutional reforms implemented in the sector to increase efficiency	The Electricity Regulatory Committee (ERC) becomes operational.	Proclamation 141 provides for ERC to be established.	Personnel in MEM are occasionally assigned regulatory tasks and have issued written opinions addressed to the Minister on specific regulatory issues such as tariffs.	By June 2010 ERC will have issued written regulatory orders/directives (e.g. on tariff adjustment, service standards; etc.).	Bank supervision reports (ISRs)

Components	Intermediate outcome / Output Indicators	Baseline (2001)	Progress to date (May 2008)	Target Values	Reporting Instruments and Responsibility
A. Asmara Distribution System Rehabilitation and Expansion					
Asmara distribution system rehabilitated and expanded.	A new substation (Asmara North) is constructed and three existing substations are rehabilitated.	The substations serving EEC customers in Asmara are antiquated and cannot provide reliable service.	Asmara North substation under construction in March 2007 (site leveling completed and foundation work started).	A new substation (Asmara North) is constructed and three existing substations are rehabilitated by 2010.	Progress reports (EEC)
	About 30km of 15kV underground cable and 60km of 15kV overground cable is installed.	Inadequate 15kV lines cannot meet demand reliably.	100 percent of 15kV cable has been delivered to the contractors site in Asmara	About 30km of 15kV underground cable and 60km of 15kV overground cable is installed by 2010.	
	About 40km of existing 5.5 kV lines are upgraded to 15kV.	5.5 kV lines in use (high losses)	100 percent of 15kV cable has been delivered to the contractors site in Asmara	About 40km of existing 5.5 kV lines are upgraded to 15kV by 2010.	
	About 1,000 km of existing open-wire L.V. (low voltage) lines are replaced with Aluminum Bundled Cable (ABC).	Existing L.V. open wire is dangerous and is cause of high losses.	100 percent of ABC cable has been delivered to the contractors site in Asmara	About 1,000 km of existing open-wire L.V. (low voltage) lines are replaced with Aluminum Bundled Cable (ABC) by 2010.	
	About 200 transformers are replaced with new ones.	Existing transformers are cause of high losses and unreliable service.	50 percent of transformers have been delivered to the contractors site in Asmara	About 200 transformers are replaced with new ones by 2010.	
B. Rural Electrification by EEC					
Electricity network extended to approximately 59 villages and towns.	About 500km of MV (medium voltage) lines is constructed from 4 major towns to 59 rural villages and towns.	Towns and villages are unelectrified.	100 per cent of MV lines completed.	Electricity network extended to approximately 59 villages and towns by July 2008.	Progress Reports (EEC)
	About 400km of L.V. lines are installed in 59 rural towns and villages.	Towns and villages are unelectrified.	95 per cent of L.V. completed.		

Components	Intermediate outcome / Output Indicators	Baseline (2001)	Progress to date (May 2008)	Target Values	Reporting Instruments and Responsibility
C. Funding for the Rural Electrification (RE) Fund					
RE Fund established and Operational Manual prepared.	RE Fund is established.	No funding mechanism for available for community based or private suppliers. Rural electrification by community or private operators has not been tested.	The RE Fund is established with the Commercial Bank of Eritrea and has a balance of Nakfa 15 million (US\$ 1 million) in March 2008. An Operational Manual for RE Fund has been drafted.	The Operational Manual for RE Fund is prepared by June 2009.	MEM Progress reports
D. Sector Reform and Institutional Capacity Building					
Setting up a regulatory function.	A regulatory unit is established (Electricity Regulatory Committee (ERC) within MEM with specific tasks by 2009.	No regulatory function exists.	MEM has updated its Letter of Sector Policy (March 2008) for the Project Paper that confirms its intention to set up a regulatory group in MEM.	By June 2010 ERC to have issued written regulatory orders/directives (e.g. on tariff adjustment; service standards; etc.)	Progress reports (MEM and EEC)
Implement a new billing and accounting system (MIS) in EEC.	Billing and accounting methods in EEC conform to international good practice. Good practice to be measured by efficiency indicators including bill accuracy, number of customer complaints, and time take to process bills.	Billing and accounting methods do not conform to good practice and the computer system hardware has little redundancy.	Analysis of EEC billing and accounting methods, and related human resources and institutional organization, has been carried out and their recommendations have been largely accepted by EEC. In the next phase of the project the recommendations will be implemented. EEC has contracted (April 2008) with consultant for design, and oversight of implementation of new billing and accounting system. Billing and accounting efficiency targets will be proposed, implemented and tracked as part of implementation of the new MIS.	New Billing and accounting system (MIS) to be implemented by October 2009.	Progress reports (MEM and EEC)
Provide training in project management, procurement, financial management investment planning, customer care and demand management, tariff setting.	300 staff in EEC and MEM receive training.	EEC capacity is weak.	Training has been provided to 200 staff in EEC and MEM through workshops, peer to peer, study tours, etc.	By 2010, 300 staff in EEC and MEM to have received training.	

Components	Intermediate outcome / Output Indicators	Baseline (2001)	Progress to date (May 2008)	Target Values	Reporting Instruments and Responsibility
E. Environmental and Social Management					
Environmental and Social Management and Monitoring Plan for the project	Training to EEC's PMU, MEM and village administrators in environmental and social impact monitoring.	No trained personnel.	50 staff trained		
	Implementation of M&E activities.	No formal M&E work being done.	M&E arrangements were reviewed & confirmed to be in place during MTR (March 2008). Progress is regularly reported in the quarterly reports of MEM and EEC.	Environmental and Social Management and Monitoring Plan for the project is implemented by 2010.	Progress reports of MEM
	Compensation is paid as stipulated in RPF.	No compensation paid in previous projects	No trees have been cut during construction of RE component. 7 claims for compensation for crop damage have been received from farmers to date and payment made.		
	Environment and social audits to be available for ICR.		Not yet due.		
F. Rehabilitation of Generating plants					
Rehabilitation of key generation plants (Hirgigo, Beleza and Assab) through the acquisition of goods and equipment, provision of works, technical advisory services, and training.	All 4 units at Hirgigo and 3 units at Beleza and 2 units at Assab undergo overhaul during the period August '08 to August '09.	March 2008: The generation plants at Hirgigo and Beleza are approaching the threshold for operating hours (8,000) when they require major overhaul to ensure their continued availability and to avoid forced outages.	New activity May 2008.	Rehabilitation of key generation plants (Hirgigo, Beleza and Assab) through the acquisition of goods and equipment, provision of works, technical advisory services, and training is implemented by 2010.	Progress report (EEC)

Annex 6: Government Letter of Sector Policy

1. The Government provided the Bank and update of its power sector policy on March 26, 2008 that is part of the project file. In its letter the Government reaffirms its vision to ensure EEC's financial sustainability in the longer term and outlines near term measures on financial restructuring, tariff adjustment and adjustment of the Nakfa/dollar exchange rate applied to EEC's fuel purchases. The Government also outlines in the letter, its intent to operationalize the Eritrean Electricity Committee; develop renewable energy resources; rehabilitate generation plants to ensure continued reliability of electricity supply; and promote community and private sector participation in rural energy service delivery.

2. To recover EEC's financial strength, the Government in its letter declares that it will undertake the following measures.

- Postpone the transfer of the Hirgigo Power Plant loan to EEC by a further four years.
- Equalize the Nakfa/US\$ exchange rate to the official rate that is applied to EEC's purchases of fuel.
- Increase EEC's average tariff to take account of inflation (by about 10 percent per year).

3. The Government implemented its undertaking on tariff increases two months after issuing the Letter when in May 2008 it increased tariffs by 10 per cent for all categories of EEC customers.

4. The Letter does not refer to some good policies and practices that are routinely being implemented that contain EEC's costs. These include a disconnection policy for non payment and restriction of the hours of service in remote villages and towns to 4 hours a day. These towns and villages are served by isolated generation sets that have higher unit costs than those in the integrated system so reduction in the hours of service reduces fuel use and thus reduces EEC's costs. EEC also reduces its collection costs by involving village committees in bill collection and payment and by allowing meter sharing in rural villages.

Annex 7. Technical Details of Generation Plants at Hirgigo, Beleza and Assab

1. The Hirgigo Power Plant

The entire equipment of the power plant was supplied and contracted for erection and commissioning to Doosan Engine Co., Ltd of South Korea. The power plant commenced commercial operation in 2003 and is made to operate in parallel with the existing generation units at Beleza located about 15 km to the north of Asmara to form the backbone of the Interconnection System (ICS) of supply. The four gensets are MAN - B&W made, type 12 K60MC-S, 2-stroke slow speed (149.2 rpm) equipped with all auxiliary service components. They are designed to consume heavy fuel oil (420 cSt) regulated by Alfa Laval Alcap separators. The overall operation of the power plant is controlled by a fully integrated DCS system. At present the units are using 180 cSt fuel.

2. Beleza power plant.

The Beleza power plant is equipped with three gensets, each with capacity of 5700 kW, medium speed (500 rpm), 4-stroke, Wartsila VASA 46 engine commissioned in 1995. They operate in parallel with existing generating units at Hirgigo in Massawa. The engines are designed to burn heavy fuel oil (420 cSt) and presently they use 180 cSt fuel.

3. Assab power plant and other SCS power plants:

The Assab power plant is equipped with two 4-stroke medium speed (1000 rpm) Wartsila VASA 16V22 MD-D diesel engines with a capacity of 2000 kW each, erected in 1993. The plant is also equipped with seven Mirrlees Blackstone ESL8 diesel sets four strokes, medium speed (750rpm) engines with capacity of 680kW each erected during the year 1988. Compressed air is used for starting the units. All gensets run on light diesel fuel.

Annex 8: Mainstreaming HIV/AIDS in EEC Workplace

1. EEC has collaborated with the Ministry of Health to establish over 1,100 staff that are targeted by the HIV work place program which has established with 5 groups of 75 peer educators led by a facilitator for each of the groups. The peer groups are composed of over 60 percent young people aged 30 years and below. The main HIV work place interventions taking place in EEC include:
 - Downloading information and sharing learning on HIV
 - Inviting people living with HIV to share experiences and learning
 - Inviting elders to undertake HIV counseling and skills building among the peer group members
 - Peer group members promoting behavior change among staff members in EEC
2. From the year 2008 onwards EEC plans to expand the HIV mainstreaming activities to cover both (i) the currently ongoing internal HIV mainstreaming activities targeting the EEC employees; and (ii) external HIV mainstreaming activities targeting the customers, relatives and friends who interact with EEC employees.
3. In the proposed internal mainstreaming activities, EEC will target the employees with:
 - Continuation of the activities of peer groups and establishment of additional peer groups, at least 5 additional peer groups will be established every year
 - Half yearly HIV educational and experience sharing talks by guest PLHIV speakers
 - Half yearly group counseling and life skills sessions by community elders
 - Video shows and sharing of HIV literature every two weeks among the peer groups
 - Linking and referring affected staff to service delivery centers where they can receive HIV/AIDS/STI treatment, care and support.
4. For the external HIV mainstreaming activities, the EEC plans:
 - To develop and print HIV behavior change communication messages on the monthly electricity bills for customers
 - To develop and produce HIV behavior change brochures, fliers, and stickers which are attached to and distributed with the customers monthly bills
 - To build capacity for EEC peer educators to share knowledge and skills with their relatives, customers and communities to protect themselves from HIV

Annex 9: Statement of Loans and Credits

CAS Annex B8 - Eritrea
 Operations Portfolio (IBRD IDA and Grants)
 As Of Date 01/11/2006

Closed Projects 0

IBRD/IDA *	
Total Disbursed (Active)	138.28
of which has been repaid	0.00
Total Disbursed (Closed)	311.87
of which has been repaid	3.51
Total Disbursed (Active + Closed)	450.15
of which has been repaid	3.51
Total Undisbursed (Active)	90.82
Total Undisbursed (Closed)	0.00
Total Undisbursed (Active + Closed)	90.82

Active Projects		Last PSR		Fiscal Year	Original Amount in US\$ Millions			Difference Between Expected and Actual Disbursements ¹			
Project ID	Project Name	Development Objectives	Implementation Progress		IBRD	IDA	GRANT	Cancel.	Undisb.	Orig.	Firm Rev'd
P070272	ER-Education Sec SIL (FY03)	MS	MU	2003	45.0				31.46	22.52	1.12
P073604	ER-Emerg Demob & Reint ERL (FY02)	MS	S	2002	60.0				5.62	-5.18	
P094694	ER-HIV/AIDS/STV/TB/Malaria/RH SIL (FY05)	S	S	2005	24.0				10.13	0.67	
P034154	ER-Ports Rehab SIL (FY98)	S	S	1998	30.3				8.79	6.69	6.64
P057929	ER-Power Distribution SIL (FY05)	S	MS	2005	50.0				34.81	21.13	
Overall Result					209.3				90.82	45.83	7.76

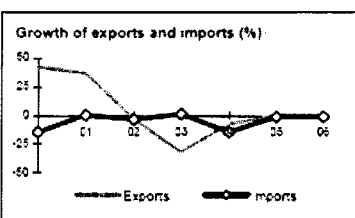
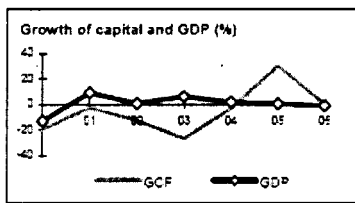
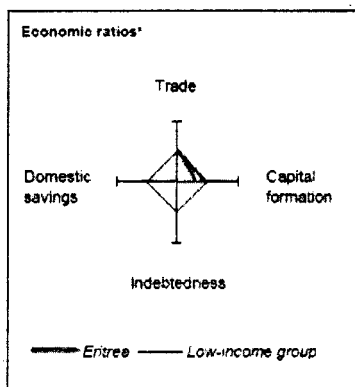
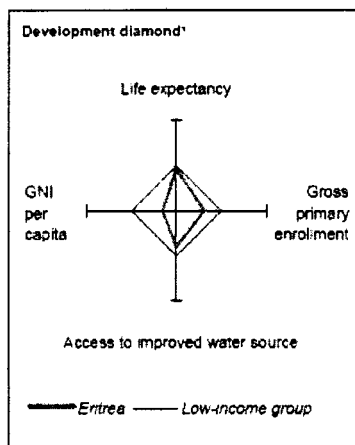
Annex 10: Country at a Glance

Eritrea at a glance

9/28/07

POVERTY and SOCIAL	Eritrea	Sub-Saharan Africa	Low-income		
2006					
Population, mid-year (millions)	4.5	770	2,403		
GNI per capita (Atlas method, US\$)	200	842	650		
GNI (Atlas method, US\$ billions)	0.91	648	1,562		
Average annual growth, 2000-06					
Population (%)	4.1	2.4	1.9		
Labor force (%)	4.0	2.6	2.3		
Most recent estimate (latest year available, 2000-06)					
Poverty (% of population below national poverty line)	..	..	..
Urban population (% of total population)	20	36	30		
Life expectancy at birth (years)	55	47	59		
Infant mortality (per 1,000 live births)	50	96	75		
Child malnutrition (% of children under 5)	40	30	..		
Access to an improved water source (% of population)	60	56	75		
Literacy (% of population age 15+)	..	59	61		
Gross primary enrolment (% of school-age population)	64	92	102		
Male	71	98	108		
Female	57	86	96		
KEY ECONOMIC RATIOS and LONG-TERM TRENDS					
	1986	1996	2005	2006	
GDP (US\$ billions)	..	0.89	0.97	1.1	
Gross capital formation/GDP	..	27.8	20.1	18.7	
Exports of goods and services/GDP	..	29.2	8.8	8.0	
Gross domestic savings/GDP	..	-30.6	-26.8	-23.3	
Gross national savings/GDP	..	7.4	10.3	8.7	
Current account balance/GDP	..	-15.0	-14.9	-14.2	
Interest payments/GDP	0.9	..	
Total debt/GDP	..	6.4	75.8	..	
Total debt service/exports	
Present value of debt/GDP	42.3	..	
Present value of debt/exports	
	1986-96	1996-06	2005	2006	2006-10
(average annual growth)					
GDP	..	0.9	0.5	-1.0	..
GDP per capita	..	-2.9	-3.4	-4.0	..
Exports of goods and services	..	-6.7	-0.1	-1.1	..

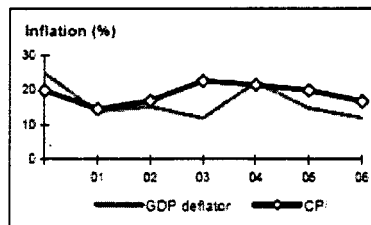
STRUCTURE of the ECONOMY	1986	1996	2005	2006
(% of GDP)				
Agriculture	..	18.0	22.6	17.5
Industry	..	21.0	22.6	23.0
Manufacturing	..	9.6	8.2	8.7
Services	..	61.0	54.8	59.5
Household final consumption expenditure	..	91.8	82.2	80.9
General gov't final consumption expenditure	..	38.7	44.6	42.4
Imports of goods and services	..	87.4	55.7	50.0
(average annual growth)				
Agriculture	..	-2.8	8.4	5.3
Industry	..	2.1	..	..
Manufacturing	..	2.8	..	..
Services	..	1.6	..	..
Household final consumption expenditure	..	-6.0	..	..
General gov't final consumption expenditure	..	9.7	..	..
Gross capital formation	..	-4.7	30.2	0.4
Imports of goods and services	..	-3.4	-1.2	-1.0



Note: 2006 data are preliminary estimates.
 This table was produced from the Development Economics LDB database.
 * The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

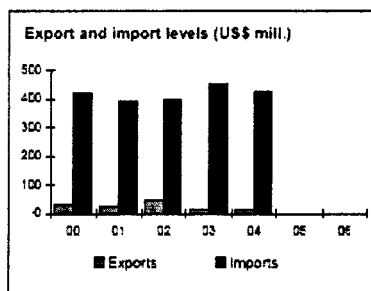
PRICES and GOVERNMENT FINANCE

	1986	1996	2005	2006
Domestic prices				
(% change)				
Consumer prices		10.3	19.9	16.7
Implicit GDP deflator		9.1	14.9	12.0
Government finance				
(% of GDP, includes current grants)				
Current revenue		42.3	..	..
Current budget balance		-0.4	..	..
Overall surplus/deficit		-20.2	..	..



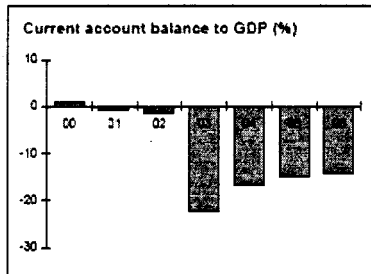
TRADE

	1986	1996	2005	2006
(US\$ millions)				
Total exports (fob)		95	..	..
Food and live animals		15	..	..
Beverages and tobacco		4	..	..
Manufactures		41	..	..
Total imports (cif)		514	..	..
Food		85	..	..
Fuel and energy		48	..	..
Capital goods		162	..	..
Export price index (2000=100)		114	..	..
Import price index (2000=100)		109	..	..
Terms of trade (2000=100)		105	..	..



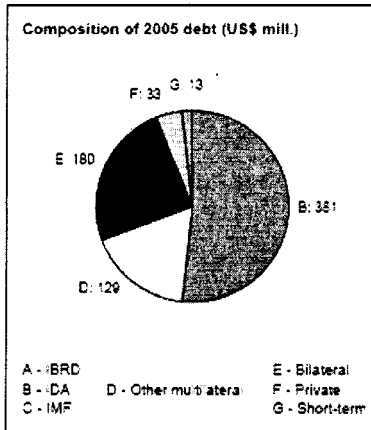
BALANCE of PAYMENTS

	1986	1996	2005	2006
(US\$ millions)				
Exports of goods and services		200	64	64
Imports of goods and services		567	572	564
Resource balance		-367	-508	-501
Net income		-8	-8	-6
Net current transfers		271	371	353
Current account balance		-104	-145	-154
Financing items (net)		29	..	..
Changes in net reserves		76	..	..
Memo:				
Reserves including gold (US\$ millions)		126	16	16
Conversion rate (DEC. local/US\$)		6.4	15.5	15.4



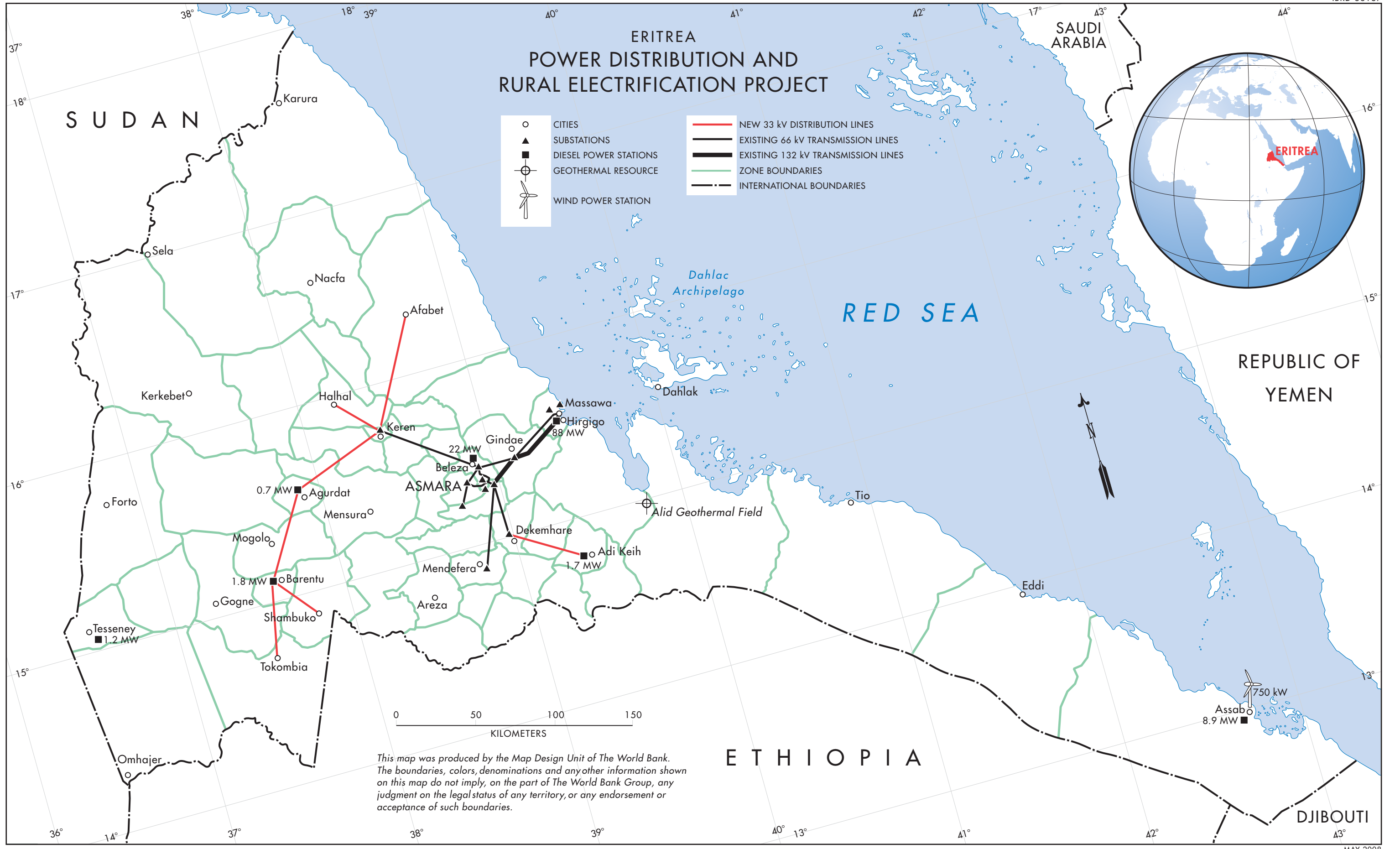
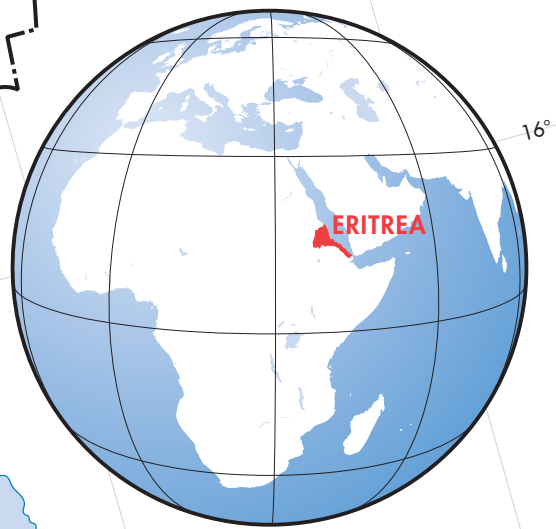
EXTERNAL DEBT and RESOURCE FLOWS

	1986	1996	2005	2006
(US\$ millions)				
Total debt outstanding and disbursed		44	736	..
IBRD		0	0	0
IDA		27	381	419
Total debt service		..	21	..
IBRD		0	0	0
IDA		0	4	4
Composition of net resource flows				
Official grants		92	237	..
Official creditors		7	59	..
Private creditors		0	0	..
Foreign direct investment (net inflows)		37	11	..
Portfolio equity (net inflows)	
World Bank program				
Commitments		18	0	0
Disbursements		1	57	20
Principal repayments		0	1	1
Net flows		1	57	19
Interest payments		0	3	4
Net transfers		1	54	16



ERITREA POWER DISTRIBUTION AND RURAL ELECTRIFICATION PROJECT

- CITIES
- ▲ SUBSTATIONS
- DIESEL POWER STATIONS
- ⊕ GEOTHERMAL RESOURCE
- ⚡ WIND POWER STATION
- NEW 33 kV DISTRIBUTION LINES
- EXISTING 66 kV TRANSMISSION LINES
- EXISTING 132 kV TRANSMISSION LINES
- ZONE BOUNDARIES
- · - · INTERNATIONAL BOUNDARIES



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ETHIOPIA