Ethiopian Electric Power Corporation
EEPCO

Environmental and Social Impact Assessment

Ethiopia Energy Access Project

Addis Ababa February 2002

Contents

Abbreviations

ABC	Areal Bundled Cable an insulated multiple cable delivering power to consumers;
ACSI	Amhara Credit and Saving Institutions
ADF	African Development Fund
CBO	Community Based Organisation
CEINFMP	Cooking Efficiency Improvement and New Fuels Marketing Project
DA	Development Agents (extension officers)
DSCI	Dedebit Credit and Saving Institution of Tigray
EA	Environmental Assessment - which under World Bank guidelines incorporates social assessment
EARO	Ethiopian Agrocultural Research Organisation
EELPA	Ethiopian Electric Light and Power Authority (now restructured as EEPCO)
EEPCO	Ethiopian Electricity and Power Corporation
EIA	Environmental Impact Assessment
EPA	Environmental Protection Authority
EREDPC	Ethiopian Rural Energy Development and Promotion Centre
EWCO	Ethiopian Wildlife Conservation Organisation
EWNHS	Ethiopian Wildlife and natural History Society
FFDME	Finfine Forest Development and Marketing Enterprise
IBRC	Institute of Biodiversity Conservation and Research
ICS	Inter Connected System - the main power distribution grid
kV	kilo volt - 1,000 volts
LDC	Load Dispatch Centre
MFI	Micro-Finance Institutes
NGO	Non Governmental Organisation
NRMRD	Natural Resources Management and Regulatory Department (Ministry of Agriculture)
OCSI	Omo Credit and Savings Institutions of the SNNP region
OMFI	Oromia Micro-Finance Institution
OP	Operational Policy - of the World Bank
PCB	Polychlorinated Biphenyls a persistent organic pollutant once added to transformer oils
PFU	Project Focal Unit – the proposed management unit for the forestry related interventions in SNNP
POP	Persistent Organic Pollutant
ROW	Right of Way - the line followed by the poles and overhand conductors
SCADA/EMS	Supervisory Control and Data Acquisition/Energy Management System
SCS	Self Contained System - diesel or other local power generation systems.
SNPPR	Southern Peoples Nations and Nationalities Region
WB	World Bank
WBISPP	Woody Biomass Inventory and Strategic Planning Project
wereda	Rural town and local government administrative division
XPLE	Cross-Linked Polyethylene three core insulated cable

Executive Summary

The Ethiopian Energy Access Project has two distinct sectoral interventions: electrical power distribution and traditional energy supplies. These two aspects have been brought together into a single project concept which is set out in the World Bank Aide Memoire prepared by the World Bank Review Mission in October 2001, following discussions with EEPCO, the Ministry of Agriculture and Energy II project management units. The project follows on from previous Bank supported interventions.

EEPCO has commissioned this study in response to World Bank requests, on behalf of all concerned agencies.

The project has the following components:

Power Distribution

- Policy Reform continuing the activities commenced under Energy II;
- Urban Distribution rehabilitating systems in Addis Ababa and seven other centres
- Load Dispatch Centre to be installed in the proposed new EEPCO headquarters;
- Rural Electrification erection of overhead line extensions to around 100 rural towns/wereda
- Community based rural electrification, a planning phase for local power generation;

Traditional Energy

- Strategic National Plan and Policy, based on the Regional Strategic Plans;
- Community Based Sustainable Natural Forest Management establishing 440,000 ha of community managed forest in SNNP;
- Micro/Small Scale Agroforestry establishing 240,000 ha of schemes in SNNP
- Rationalisation Plan for Woodfuel Supply to Addis Ababa assisting "women carriers" to sustainably manage woodfuel plantations;
- Improved Stoves supporting stove producers in Tigray, Amhara, Oromia and SNNP;
- Inter-Fuel Substitution, supporting selected studies and focused research.

The World Bank has indicated that they consider the proposed project to be a "Level B project". As such, an Environmental Assessment is required, but its scope corresponds to the limited expected environmental impacts of the project. This report only evaluates those project components with direct interventions, planning components are not considered as having environmental or social impacts.

The World Bank is particularly concerned to ensure that the proposed project components do not trigger World Bank Safeguard Policies. In addition, although there is as yet no legislation in Ethiopia demanding Environmental Impact Assessment or disclosure, there are EIA guidelines and a draft EIA Proclamation before the government.

To a large extent the Ethiopian EIA Guidelines reflect World Bank Requirements, including in the Ethiopian guidelines "Environmentally Sensitive Areas". These are described as key wildlife habitats, protected areas and historic or archaeological sites. This is the direct equivalent of the World Bank Operational Policies on Natural Habitats and Cultural Property.

One major concern is always resettlement, and in the World Bank draft Operational Policy 4.12 which will replace the current one, the concept of resettlement and compensation is extended to include those with usufruct or custimary rights to land or resources.

The following table summarises the expected project component impacts and the ten safeguard policies.

	Urban Distribution	Load Dispatch Centre	Rural Electrification	Community Forestry	Agroforestry	Addis Wodfuel	Improved Stoves
4.01 Environmental Assessment	Overall project classified as "Level B", with some components which would not generally require an environmental assessment						
4.04 Natural Habitats	None	None	Minimised	Positive			
4.09 Pest Management	Not Applicable						
4.36 Forestry	None	None	None	Positive			
4.37 Safety of Dams	Not Applicable						
4.11 Cultural Property	None	None	Minimised	Not Applicable			
4.20 Indigenous Peoples	None	None	None	Not expected	Not Applicable		
4.30 Involuntary Resettlement (and OP/BP 4.12)	No land acquisition expected, but crop damage during construction will occur			No land acquisition required for these components			
7.50 International Waterways	Not Applicable						
7.60 Disputed Areas	Not Applicable						

Resettlement and Indigenous Peoples

None of the project components are expected to require any significant land acquisition.

The urban power rehabilitation includes some extension, however this is from existing substations or on land already acquired for substations.

Similarly the rural electrification programme uses existing substations or in two cases has already acquired the land for new substations. The 33 kV line extensions cross-farmland, and compensation is paid for crop loss during line erection. However there is effectively no land lost to the farmer who can cultivate or graze right up to the base of the post. EEPCo's current procedures for crop damage compensation should be amended to be consistent with the World Bank's OD 4.12 guidelines and should form the basis for compensation.

To some extent there could be more concern with the proposed interventions in the natural forests, however as the forests are to be transferred to community ownership and management following full stakeholder consultation this should not affect current usufruct rights. This consultation process also avoids any issues of excluding indigenous peoples.

Natural Habitats and Cultural Property

The only project component with potential negative impacts on natural habitats or cultural property is rural electrification, however this can be avoided completely by alternative line routing. Following line survey the maps of the line routes will be provided to EPA for approval and other concerned agencies will be consulted as necessary. In the event that a line would pass through a sensitive area the route will be realigned.

Forestry

The overhead extensions are not expected to go through forestry areas, if however they are routed through forest areas, the land clearance is only around a third of a hectare for every kilometre of extension. Again line routing will minimise any problems.

The forestry interventions are all positive as they are designed to reduce demand for forestry resources or improve the management existing natural forests.

The key impacts and management interventions are given below:

1. Urban Distribution – there is a possibility that some of the older transformers to be replaced may contain Polychlorinated Biphenyls (PCB) a persistent organic pollutant. This can be checked through an audit as every transformer is tagged with the manufacturers name, date and model number. If there is any suspicion of PCB contamination EEPCO will contact UNDP/UNEP for the latest recommendations on safe disposal. During construction there could be disruption to the flow of vehicular traffic and pedestrians and open cable trenches could pose a danger to pedestrians and animals. To minimise the likelihood of this negative impact EEPCo should abide by its operational and safety rules.
2. Rural Electrification – the first step in reducing negative impacts is line routing and as previously stated the proposed line route will be confirmed following consultation with EPA, EWNHS, EARO, IBCR and other stakeholders before line erection commences. Any sensitive areas will be avoided by re-routing. Compensation for crop damage during line erection will be agreed with a local committee formed by the wereda authorities and including community elders, before construction starts (see Resettlement Framework), and checked after completion. EEPCO will specify concrete poles to reduce demand for timber resources. There is concern over possible bird/power line interactions. EEPCO will specify the arm-less compact pole design, which is known to minimise bird electrocutions. EEPCO will install flappers in areas where flight paths are found to cross lines and bird deaths occur.
3. Load Dispatch Centre – this will be installed in the new EEPCO headquarters to be constructed off Mexico Square. There are no incremental impacts from the installation of the LDC as the headquarters will be constructed anyway. The building is not part of the current project.
4. Community Based Sustainable Natural Forest Management – no major negative impacts are expected, however species proposed for forest rehabilitation will be evaluated with the Institute for Biodiversity Conservation and Research to ensure that no bio-pollution occurs from invasive or weed species. The project will also draw up a public consultation plan once specific communities have been identified and also a training plan covering participatory techniques and community management.
5. Micro/Small Scale Agroforestry – no major negative impacts are expected, and the threat from poor selection of species is less than for planting in natural forests, however again the project will check the acceptability of proposed species with Institute for Biodiversity Conservation and Research.
6. Rationalisation Plan for Woodfuel Supply to Addis – no major negative impacts are expected.
7. Improved Stoves– no major negative impacts are expected.

1 Introduction

The Ethiopian Energy Access Project has two distinct sectoral interventions: electrical power distribution and fuelwood and improved stoves. These two aspects have been brought together into a single project concept which is set out in the World Bank Aide Memoire prepared by the World Bank Review Mission in October 2001, following discussions with EEPCO, the Ministry of Agriculture and Energy II project management units. The project follows on from previous Bank supported interventions.

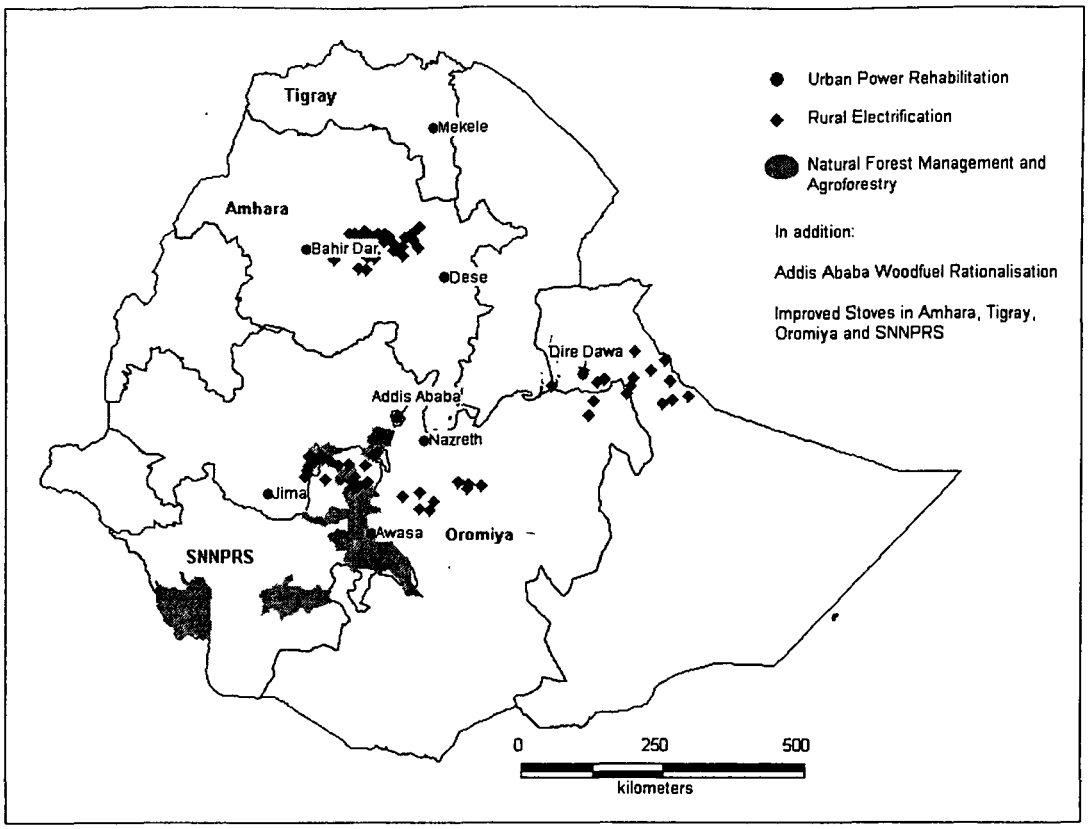
The project, as defined in the Aide Memoire has the following components:

- Power Distribution
- Policy Reform, continuing the activities commenced under Energy II, including the involvement of other parties in power generation, distribution, supply and other services;
- Urban Distribution, primarily the replacement and rehabilitation of the existing power distribution systems in the major urban centres of Addis Ababa, Nazreth, Awassa, Bahir Dar, Mekele, Jimma, Dessie, and Dire Dawa.
- Load Dispatch Centre, part of the works covered in the proposed new buildings for EEPCO in Addis Ababa;
- Rural Electrification, including two new sub-stations at Gashena and Nefas Mewcha and the construction of typically 15 or 33 KV overhead line extensions to provide power to around 100 rural towns/wereda in Ahmara, Southern Peoples Nations and Nationalities Region (SNNP), Oromiya and Somali.
- Community based rural electrification, a planning phase for local power generation;
- Traditional Energy
- Strategic National Plan and Policy, based on the Regional Strategic Plans prepared by the Woody Biomass Inventory and Strategic Planning Project (WBISPP);
- Community Based Sustainable Natural Forest Management, supporting the regional office of the Forestry Service in establishing and monitoring 440,000 ha of community managed forest in SNNP, to be expanded under phase 2 to other regions;
- Micro/Small Scale Agroforestry, supporting the regional offices of the Forestry Service in SNPPR in establishing and monitoring 240,000 ha of schemes to produce new sustainable forest stocks to supply woodfuel in rural areas;
- Rationalisation Plan for Woodfuel Supply to Addis Ababa, providing technical assistance to "women carriers" to sustainably manage the woodfuel plantations around Addis Ababa, improving the transportation systems and establishing urban nurseries, to be managed by Finfine Forest Development and Marketing Enterprise (FFDME);
- Improved Stoves, through training and supporting stove producers in Tigray, Amhara, Oromia and SNNP through the Ethiopian Rural Energy Development and Promotion Centre (EREDPC)
- Inter-Fuel Substitution, supporting selected studies and focused research and development on fuel substitution options through EREDPC.

This study covers the four components expected to involve direct interventions under the first phase of the project - *Urban Distribution, Load Dispatch Centre, Rural Electrification, and Traditional Energy.*

This study has been commissioned by EEPCO on behalf of all concerned agencies.

This report is based on draft project documents available in advance of the final project proposals, which may be modified in light of this report and further project development. The description of project components may therefore differ from the final project documents.



Map 1 Proposed Sites for Project Interventions

2 Policy, Legal and Administrative Framework

2.1 World Bank Requirements

The World Bank has indicated that they consider the proposed project to be a "Level B project". As such, an Environmental Assessment is required, but its scope corresponds to the limited expected environmental impacts of the project.

The World Bank policy on disclosure is currently under review, but the present proposals state that Category B Environmental Assessment reports should be brief self standing documents, and that disclosure is a pre-requisite for appraisal of the project[1].

The World Bank provides guidance on requirements in the *Environmental Assessment Sourcebook*, which (in digital form) includes the most recent versions of the World Bank Operational Policies as well as the updates. The World Bank has ten "Safeguard Policies" whose primary objective is to ensure that Bank operations do not cause adverse impacts and that they "do no harm." The ten safeguard policies are grouped into Environment, Rural Development, Social Development and International Law.

Of these ten safeguard policies, three are not applicable as they relate to international law on waters and disputed areas, and the safety of dams. The following safeguard policies have been considered in this study.

[1] "*Disclosure Policy Revisions August 2001*" and the 2000 draft "*World Bank Policy On Information Disclosure*"

2.1.1 Environment

OP 4.01 Environmental Assessment

Ensures that appropriate levels of environmental and social assessment are carried out as part of project design. It also deals with the public consultation process, and ensures that the views of project-affected groups and local NGOs are taken into account.

However, this does not guarantee that the views of minority groups or economically or socially disadvantaged groups are incorporated into proposals[2]. To some extent these issues are covered under OP 4.20 Indigenous People and OP 4.30 Involuntary Resettlement.

It is worth noting that OP 4.01 applies to all components of a project with financing from the World Bank, including cofinanced components financed by the recipient or by other agencies[3].

OP 4.04 Natural Habitats

Supports the conservation of natural habitats and the maintenance of ecological functions. The Bank does not support projects that involve the significant conversion or degradation of critical natural habitats.

2.1.2 Rural Development

OP 4.09 – Pest Management

Promotes the use of biological or environmental control methods and reduces reliance on synthetic chemical pesticides, and follows World Health Organisation's Recommended Classification of Pesticides by Hazard and Guidelines to Classification.

OP 4.36 – Forestry

Aims to reduce deforestation and enhance the environmental and social contribution of forested areas, the Bank does not support commercial logging in primary tropical moist forest.

2.1.3 Social Development

OP 4.11 – Management of Cultural Property

The Bank avoids projects that will significantly damage non-replicable cultural property, and will assist only those projects that are sited or designed so as to prevent such damage.

OD 4.20 – Indigenous Peoples

Defined as *"...social groups with a social and cultural identity distinct from the dominant society that makes them vulnerable to being disadvantaged in the development process. For the purposes of this directive, "indigenous peoples" is the term that will be used to refer to these groups."*

Projects must avoid or mitigate potentially adverse effects on indigenous people whose social and economic status restricts their capacity to assert their interests and rights in land and other productive resources.

Effectively the World Bank requires the project to develop a programme for addressing issues based on the informed participation of the indigenous people themselves. Any project that affects indigenous

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[2] *"A review of Bank experience found that while an increasing number of EAs involved consultation with NGOs, consultation with local communities was more limited. Women and the poor were seldom reached..."* Update Number 5 - Environmental Assessment Sourcebook - Public Involvement in Environmental Assessment: Requirements, Opportunities and Issues

[3]. Footnote 1 of OP 4.01 *""Bank" includes IDA; "EA" refers to the entire process set out in OP/BP 4.01; "loans" includes credits; "borrower" includes, for guarantee operations, a private or public project sponsor receiving from another financial institution a loan guaranteed by the Bank; and "project" covers all operations financed by Bank loans... This policy applies to all components of the project, regardless of the source of financing."*

peoples is expected to include components or provisions that incorporate an "Indigenous Peoples Development Plan".

OD 4.30 – Involuntary Resettlement (and the draft OP/BP 4.12 Involuntary Resettlement)

Ensures that the population displaced by a project receives benefits from it; it also covers those with usufruct or customary rights to the land or other resources taken for the project[4]. The OP is specifically inclusive, ensuring that all those affected both directly and indirectly by project developments are compensated as part of the project. Affected population, include those with income derived from informal sector and non-farm activities, and from common property resources. The absence of legal title does not limit rights to compensation.

The draft OP/BP 4.12 on Involuntary Resettlement will replace the original OD 4.30, but retains and clarifies the existing principles covering household resettlement and restricted access rights, specifically where the loss of access rights is linked to the management of protected areas.

The guidelines are clear that there is a need to involve communities in the planning and implementation of interventions that result from these polices and in most cases this implies the need for a conflict resolution mechanism. OP 4.12 states *"...particular attention is paid to the needs of vulnerable groups ... especially those-below the poverty line, the landless, the elderly, women and children, indigenous peoples and ethnic minorities."*.

Table 1 World Bank Safeguard Policies and Project Component Impacts

	Urban Distribution	Load Dispatch Centre	Rural Electrification	Community Forestry	Agroforestry	Addis Wodfuel	Improved Stoves
4.01 Environmental Assessment	Overall project classified as "Level B", with some components which would not generally require an environmental assessment						
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7.50 International Waterways	Not Applicable						
7.60 Disputed Areas	Not Applicable						

2.2 National Policy Framework

The Environmental Protection Authority (EPA) was established in 1995 to *"...ensure that all matters pertaining to the country's social and economic development activities are carried out in a manner that will protect the welfare of human beings as well as sustainably protect, develop and utilise the resource bases on which they depend for survival"* (Federal Negarit Gazeta of the Federal Democratic Republic of Ethiopia - Proclamation No 9/1995).

[4] World Bank ESSD definition *"In some instances, people may lose the right to use resources without losing possession of them. Such involuntary loss of access to resources may also be considered involuntary resettlement."*

The EPA has the responsibility of supervising the implementation of the Environmental Impact Assessment process:

- Ensuring that the proponent complies with requirements of the EIA process;
- Maintaining co-operation and consultation between the different sectoral agencies throughout the EIA process;
- Maintaining a close relationship with the proponent and to provide guidance on the process; and
- Evaluating and taking decisions on the documents that arise from the EIA process.

EIA is not currently a legal requirement in Ethiopia, but a framework environmental law is under preparation and there is a draft proclamation under review which can be expected to become legally binding during the proposed project lifetime.

The EIA guidelines draw on procedures recommended by the World Bank, the African Development Bank, the Norwegian Government (particularly as regards to hydropower development) and other recognised national and international standards.

The EIA Guidelines have specific references to development projects which are relevant to the proposals as follows:

- Schedule 1: Projects which may have adverse and significant environmental impacts, and may, therefore, require full EIA.

  Schedule 1 does not apply to any of the proposed project components, unless they affect "Environmentally Sensitive Areas", such as areas which harbour protected, threatened or endangered species, areas of particular historic or archaeological interest, primary forests, wetland of national or international importance, National Park and protected area. (equivalent to the World Bank Natural Habitats and Cultural Property OPs)

- Schedule 2: Projects whose type, scale or other relevant characteristics have potential to cause some significant environmental impacts but not likely to warrant an environmental impact study.

  Schedule 2 applies to the electricity distribution lines (only the high power grid transmission lines would be considered to require a full EIA)

- Schedule 3. Projects which would have no impact and do not require environmental impact assessment.

  No EIA would be required for any of the other components, as even the forestry interventions while covering significant total areas, will all be implemented at the micro-level, with the community managed forests dealing with small fragmented forest areas, and the agroforestry taking place on individual farms.

Based on the stated criteria in the EIA Guidelines, this study should satisfy national EIA requirements as well the World Bank requirements.

2.2.1 Disclosure within Ethiopia

Following the guidelines and draft proclamations, EEPCO is responsible for passing this report to EPA for review, and following responses from the EPA, EEPCO, with support from the environmental consultant, is responsible for any required modifications required by the EPA.

According to the draft proclamation:

> *"The Authority or the relevant regional environmental agency shall make any environmental impact study report accessible to the public and solicit comments on it.*
>
> *The Authority or the relevant regional environmental agency shall ensure that the comments made by the public and in particular by the communities likely to be affected by the implementation of a project are incorporated into the environmental impact study report as well as in its evaluation."*

The EPA is therefore responsible for disclosure within Ethiopia.

3 The Proposed Project

3.1 Urban Distribution

The 15kV distribution networks are overloaded and in a poor state of repair. Power transfer capability to adjacent circuits is virtually impossible. This is particularly the case for Addis Ababa.

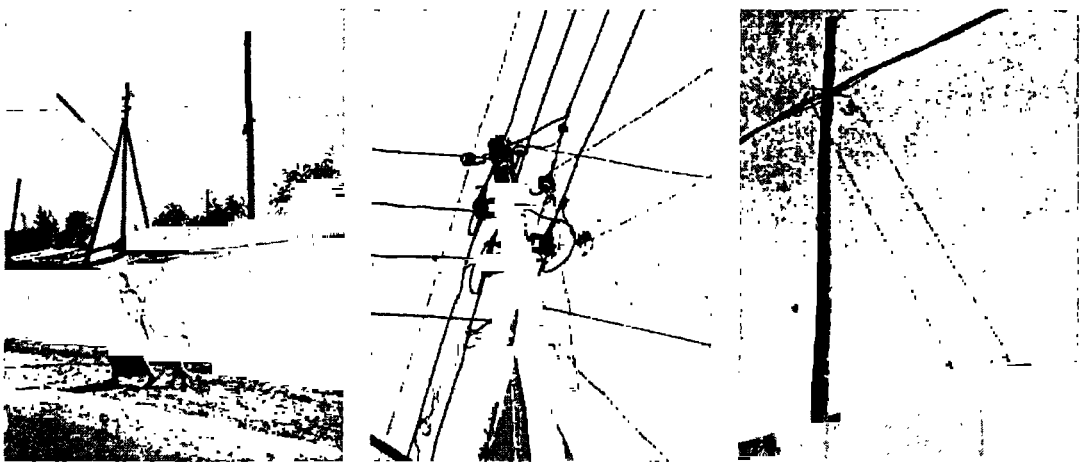
The problems are characterised by frequent interruptions of services, demonstrated at the consumer end by a total of over 57,000 emergency calls in Addis Ababa alone during the 2000 budget year. There are also high energy losses, estimated at 18%, and overloading of lines and distribution transformers.

The main causes of these problems is old conductor line breaking, trees falling on lines, bare conductors touching each other and shorting, bare conductors touching vegetation, houses and other objects, and the collapse of wooden poles. This is clearly not just a power problem but also a major safety risk to urban populations.

The urban distribution project focuses on rehabilitating existing systems with the following key interventions:

- Concrete poles replacing many of the present wooden poles, reducing risk of collapse;
- Replacing existing bare conductor systems with areal bundled cable (ABC) an insulated multiple cable delivering power to consumers;
- Replacing existing bare overhead conductor systems with underground cable and cross-linked polyethylene (XPLE) overhead conductor system.

Photo Set 1 Existing Bare Conductor Systems and Replacement Areal Bundled Cable



The project proposal prepared by EEPCO in May 2001covers rehabilitation and expansion requirements in 15 urban centres; however the present discussions indicate that the first phase of the project will deal with eight centres: Addis Ababa, Nazreth, Awassa, Bahir Dar, Mekele, Jimma, Dessie, and Dire Dawa.

The studies carried out by EEPCO indicated the following interventions:

1. Replacement of 540 km of 15kV overhead lines;
2. Replacement of around 1800 km of low voltage lines;
3. Laying 53km of 15 kV underground cable;
4. Construction of 68 km of new 15 kV lines;
5. Construction of 60 km of 33kV lines;
6. Installation of one 132/33kV transformer;
7. Installation of thirty 33,000/400V transformers

8. Installation of four hundred and sixty 15,000/400V transformers.

The majority of the work is the replacement of existing lines and transformers. Most of the **transformers** will be pole-mounted either on existing or new pole structures, within right of way or the power lines. Some of them will be compact substations that will be ground-mounted on idle land already acquired by EEPCo.

Re-conductoring will involve the replacement of existing conductors with larger sized conductors on existing 15 kV lines and in some cases will involve the replacement of existing poles with ones with higher mechanical strength, made of concrete. On the low voltage lines, the bare conductors will be replaced with larger and stronger insulated bundled conductor. The stronger reticulations will have a positive impact from the safety point of view.

The **new lines** will be constructed mainly in peri-urban areas and, similar to the rural supply lines, will follow existing road reserves.

The **underground cables** will replace overhead lines in urban areas and will, as much as possible, follow the existing overhead line routes. When completed, therefore, the project should have a positive impact, aesthetically and from a safety point of view. During construction, however, measures will need to be taken in order to minimize disruption to traffic (both pedestrians and vehicular) and to ensure safety of humans and animals, posed especially by cable trenches. EEPCo's safety procedures will be observed, which include the erection of fences, caution and danger notices and carrying some work at week ends.

3.2 Load Dispatch Centre

The power generation and distribution network in Ethiopia is getting ever more complex, linking centres with variable demands to a grid supplied through hydropower, thermal and diesel systems.

At present EEPCO has neither a Load Dispatch Centre (LDC) nor a SCADA/EMS system (Supervisory Control and Data Acquisition/Energy Management System).

To improve the reliability of Ethiopian power system and to enable generation and distribution of electricity at the most economic rate and with the highest availability to the consumer, the Ethiopian network is planned to develop the 220 kV and lower transmission networks.

Such networks are capable of balancing energy supplies between the different areas of the network. In addition, tie-lines interconnecting Ethiopian power system with neighbouring power systems (Sudanese and Djiboutian power systems) are planned to be commissioned in the future for which central management of power transfers/exchanges is essential.

The main objective of the LDC is to apply modern control and computer technology to ensure that the power system will operate reliably and economically in continuously changing operating conditions and be able to adapt to and manage future expansions of generating capacity and demand.

This centre will be in charge of:

- Monitoring and controlling the national grid and the generation system,
- Monitoring and controlling energy exchanges,
- Coordinating the different Areas Centres[5].

The LDC will be established in the new headquarters of EEPCO, that is due to be constructed in the centre of Addis Ababa, on land that belongs to EEPCO. The preliminary office design has just been accepted, final design is expected to be completed by 2003 and construction would take four years. The building does not form part of the scope of this project.

The centre will be equipped with computer hardware and software and a tele-indicator system of data transfer/communication between the LDC and control equipment at remote sites.

[5] In EEPCO's context, there is no Regional Control Centre but the Power System Operation division of LDC is in charge of the operation of the 66 kV and 45 kV transmission grid.

3.3 Rural Electrification

The rural electrification programme is a component of the five year Power Sector Development Programme. The power distribution/electrification sub programme is aiming to electrify 164 wereda by 2005. The implementation of the rural electrification programme is being supported by a number of donors, each dealing with separate identified zones, and in some cases implementation has already started. The African Development Fund are supporting electrification to 36 rural towns, including some in the north.

The present pattern of power supply in Ethiopia is that the existing Inter-Connected system (ICS) or grid, covers the central and northern highlands, while the rest of the country is poorly served by a number of local and isolated Self-Contained Systems (SCS).

EEPCO can therefore draw on considerable experience in the design and construction of their systems, and have modified their approaches to take account of lessons learned. This review was therefore able to include recently completed distribution lines as part of the evaluation of the likely outcome of the proposed programme.

EEPCO has prepared proposals for a number of line extensions, generally dealing with a set of wereda that can be fed from a particular tapping substation. The wereda were identified with the local government and prioritised on the basis of population, social and economic activities, infrastructure and distance from the ICS.

The key components of rural electrification include the following:

- Erection of concrete poles, now standard specification.
- Stringing overhead 33kV lines;
- Installation of pole mounted distribution transformer at the wereda;
- Installation of distribution system and street lighting;
- Connection to an existing substation on the ICS, or in two cases construction of a new tapping substation on land already acquired by EEPCO;

The routing follows existing road networks, with the poles typically erected some 15 metres off the road to avoid unstable soils and allow for future road improvement and maintenance. The routing can be easily adjusted to avoid problem areas.

The EEPCO line teams are based in the local towns and casual labour is recruited from the wereda following discussions with local committees. There are no construction camps or other temporary facilities required. Although the proposed project will be implemented by the private sector under turnkey contracts, casual labour will still be recruited from the Woreda, thus providing employment to the local communities.

The following table shows a typical construction schedule.

Table 2 Rural Electrification Construction Schedule

Activity	Timing
Mobilisation - including discussions with the local government and wereda councils, arrangements for recruitment of casual labour, line survey	2 to 4 weeks
Pole Erection - transport of materials to site, digging holes, installing foundations as required, attaching arms and insulators	1 to 6 months depending on line length
Conductor stringing - transport of materials to site, stringing and tensioning	2 to 4 weeks
Transformer erection - transport of transformers to site, pole mounting at the wereda. installing additional transformers as necessary at the ICS substation	1 week
Street Lighting - installation on to wereda distribution poles	1 week
Testing and Commissioning	1 week

In all around 100 wereda have been proposed for WB support,.

The main activity is the construction of 33kV overhead line extensions from existing substations. Only two new 230/33kV substations – Geshena and Nefas Mewcha – would need to be constructed, with minimal distribution line extensions (about 1 km in total). The sites between Gilgel Gibe and Tawla would be supplied via the now well-proven distribution line shield wire design.

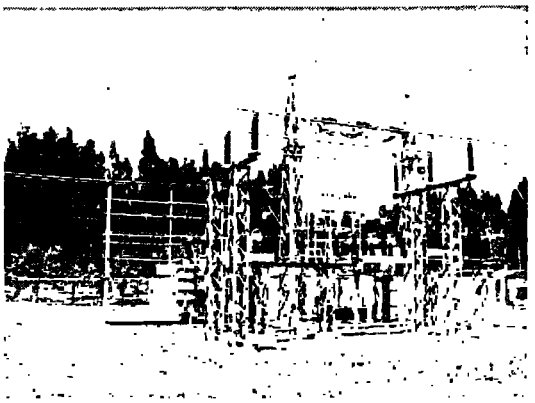
The following wereda are covered by the project proposal:

Amhara: Geregera, Faliki, Arbit, Akat, Argit, Geshena, Kon Abo, Wegel Tena, Hamusit, Estayish, Dawnut, Mewich, Chechina, Debre Zebit, Kokit, Tach Gaint, Agrat, Efrata, Betelihem, Goradit, Gob Gob, Sali, Darnot, Welela baher, Adeba, Tekilu Ketema, Mekri, Kimir Dengay, Gasagn, Welesh, Mekane Iyesus, Jibasra, Jarangendo, Hulet Ej Enese, Goncha Siso Enese, Enbise Sar Midir.

SNNP & Oromiya: Tawla, Ole, Gibe Kela, Abelti, Kumbi, Cambo Shower, Dobi, Natri, Saja, Walga, Darge, Gibe State Farm, Bezhober, Gubre, Emdibir, Weyra, Mike, Kose, Cheza, Bulki, Seduka, Addelle, Bele, Seru, Diksis, Siltana, Meraro, Gado, Negle Borena, Bitata, Harekelo, Wadera, Genale Donta, Butajira, Inseno, Koshe, Kibet, Kela, Bui, Tiya, Dalocha, Werabe, Walbureg, Arekit.

Somali: Melka Refu, Ejerza Goro, Boko, Fedis, Huse, Lefiesa, Arabi, Harshen, Awbere, Kebri Beyah, Harshin, Harti Shek, Chinakson, Faten, Hadow, Karamilie, Tefri ber.

Photo Set 2 Recently Completed Rural Line Extension from Fitche to Gohatsion, Amhara Region

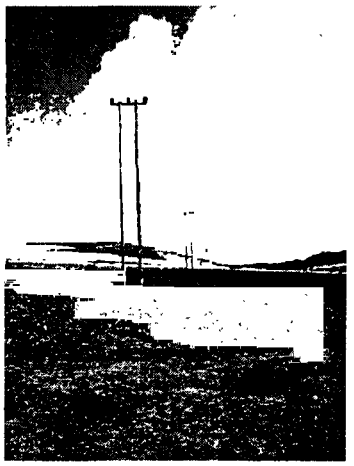


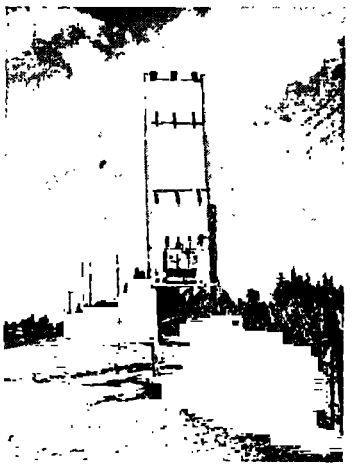
The line extension runs from the substation at Fitche, which is connected to the 66kV grid.

The 33kV lines run from the gantry which can be seen at the far right of the plot.

The 33kV overhead extension carries power to a number of rural towns, with branches to feed towns off the main route.

The total length of the this extension is around 80km. The line was completed in December 2001 and commissioned in January 2002. These photos were taken 2 months after commissioning.

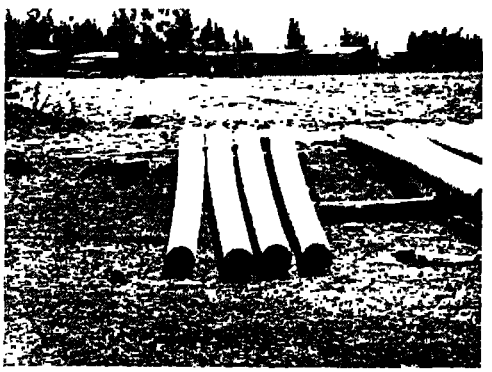




This overhead extension is carried on a treated eucalyptus H-Frame. The route follows the existing road network, generally sited around 15 metres from the road to avoid disturbed soil and allow for road maintenance. Occasionally the alignment cuts across farmland rather than follow a winding section of road, but farming can take place right up to the base of the poles. This particular extension is virtually all through farm land, crossing a short stretch of scrub bush on the side of a steep slope.

The 33kV overhead line is fed into the town supply through a pole mounted transformer. The urban distribution network supplies the street lights and small businesses and households.

The only major difference between the extension shown in these pictures and those proposed under the Rural Electrification project that concrete poles would replace the timber H-Frame.



3.4 Traditional Energy.

The traditional energy component of the project includes a number of sub-components.

- Strategic National Plan and Policy Framework for the Biomass Energy Sector, and the second to establish a national and regional natural resources database and information system.
- Community Based Sustainable Natural Forest Management, supporting the regional office of the Forestry Service in establishing and monitoring 440,000 ha of community managed forest in SNNP, to be expanded under phase 2 to other regions;
- Micro/Small Scale Agroforestry, supporting the regional offices of the Forestry Service in establishing and monitoring 240,000 ha of schemes to produce new sustainable forest stocks to supply woodfuel and other non-timber resources in rural areas in SNNP;
- Rationalisation Plan for Woodfuel Supply to Addis Ababa, providing technical assistance to "women carriers" to sustainably manage the woodfuel plantations around Addis Ababa, improving the transportation systems and establishing urban nurseries;
- Improved Stoves, training and supporting stove producers in Tigray, Amhara, Oromia and SNNP Regions, through the Ethiopian Rural Energy Development and Promotion Centre (EREDPC)
- Inter-Fuel Substitution, supporting selected studies and focused research and development on fuel substitution options through EREDPC.

The first component the Strategic National Plan and Policy Framework, as a planning and support programme, has no direct environmental impact and has therefore not been included in this study. The project will be implemented by WBISPP, from their existing facilities in Addis Ababa.

The Inter-Fuel Substitution Project is concerned with strategic planning and research, and again has no direct environmental impact and has therefore not been included in this study. An example of their focus is the the use of mixed fuels such as the addition of ethanol to kerosene for domestic use, with the ethanol produced locally from by products from the sugar industry. The project will be led by EREDPC from their existing facilities in Addis Ababa.

3.4.1 Community Based Sustainable Natural Forest Management

In 1995 the SNPPR prepared a "Five Year Development Plan" for the development, conservation and management of forests, soils, wildlife and water resources. This plan proposed to integrate community and individual based participation into the forestry sector, however, with limited resources there was little actual impact. Following further policy development, and the continued move to decentralisation of development programmes, forestry interventions will be implemented at zonal and sub-district levels.

The Regional Authorities identified target zones using the Woody Biomass Inventory and Strategic Planning Project Study of 1996, prioritised on resource availability and population demand.

The project area is densely settled and farmed. The area is intensively cultivated with only fragment forests remaining. The area is characterised by acute fuelwood shortages, and shortages of construction materials, and by soil erosion. The pressure on these remnant forest areas is primarily agricultural expansion, fuelwood and construction timber extraction and overgrazing. The annual rate of forest clearing in Sidamo, Bench, Kaffa and Zeka zones is estimated to be 42,000 hectares.

The remnant natural forest areas provide a number of resources to local communities, often with a gender difference in extraction. Men use the forests for bee keeping and collection of poles for farm implements and fencing. Women collect fuelwood for household use and sale, and collect medicinal plants and wild foods. Farmers also graze livestock in forest areas.

While remaining within the accepted parameters of the Ethiopian culture and social dynamics, the project proposes to ensure that women are not excluded from the stream of benefits that are expected to result from the project.

The project proposal has not identified specific communities, partly in recognition of the risk of raising false expectations in the case of further project delays. The project must therefore be regarded as a "process" project, with the first steps being the identification and evaluation of the issues in specific forest areas and among their user communities. The key to the project is the legal transfer of the ownership of the forests to communities.

The project objectives are to:

- Conserve and manage the remnant patches of natural forests for sustainable utilisation;
- Create awareness and initiate community participation in conservation, development and sustainable utilisation of these resources through training;
- Rehabilitate degraded patches of remnant forest through enrichment planting and hillside closure by the user communities for multipurpose use.

The main interventions are as follows:

- Identify, demarcate and assess remnant forest patches;
- Assess and identify the treatment that has to be taken to rehabilitate natural forest (enrichment planting, boundary planting, expansion planting, climber cutting...);
- Establish nurseries as a source of seedlings for rehabilitating forests;
- Raise awareness among all stakeholders through workshops, training, seminars and tours; and
- Legally pass the ownership of the patches of natural forests to the communities.

The major direct investment is in the nurseries, which are expected to produce 550 million seedlings for enrichment, boundary and expansion planting.

Table 3 Natural Forest Management Project Sites

Project Site	Estimated area of Natural Forest in Ha.
Kaficho Shakacho Zone	200,000
Bench Maji Zone	200,000
Sidama Zone	
Bensa Aroressa	25,000
Arbegona	12,000
North Omo	
Arbaminch Zuria	3,000

3.4.2 Micro/Small Scale Agroforestry

The second component in the traditional energy sector is effectively the complementary on-farm interventions designed to reduce pressure on natural forest resources and supply forest products to communities distant from the natural forest resources.

The project area has already been described above. The on-farm agroforestry interventions are designed to substitute for forest products while improving soil fertility and reducing on-farm soil erosion.

The project will train farmers in agro-forestry techniques and support an estimated 2200 households in establishing individual nurseries to produce appropriate tree seedlings for use on their farms and by other farmers in the community. The project sees women as both key stakeholders and beneficiaries.

Again the project should be recognised as a process project, as although the project has identified 33 areas with acute and/or potential soil erosion problems and fuelwood and construction timber shortages, the project starts with identifying appropriate practices for communities, and has not yet opened negotiations with specific user groups at the community level.

The project sites are already owned by individual farmers or farming communities, to whom the project will provide support and therefore no resettlement will occur. These nurseries will be dispersed and small, thus not posing any land ownership, tenure or physical availability issues. The location of the nurseries (and of the specific areas to the reforested) have already been identified within the preparation of the regional Woody Biomass Energy Strategies. These strategies were prepared over a period of 7

years (from data collection --> GIS cartography --> analysis --> strategy preparation) with the participation and consultation of the beneficiaries directly at the Regional, Zonal and Woreda levels.

Table 4 Agroforestry Project Sites

Zone	Critical Intervention Sites
Sidama	Awassa Zuria, Hagereselam, Shebedine, Dera, Aleta Wondo, Dale, Bensa
North Omo	Arba Minch Zuria, Wolayita Sodo Zuria, Chencha, Damote Gale, Sawla Gofa Zuria, Marka Gena, Humbo, Boreda Abaya, Banka, Kamba, Damot Woyde, Zala Ubamale,
Guraghe	Mesenke and Mareko, Silti, Enemor and Ener, Dalocha, Sodo, Goro, Cheha, Wolene, Gummer
Kembata, Alaba and Tumbaro	Kedida Gamela, Omo Sheleko, Kachabira, Aalaba, Angacha

The following interventions are proposed:

- Identify appropriate site specific farm forestry interventions, including species for different uses;
- Train farmers and staff in farm forestry techniques;
- Establish private nurseries, and provide multi-purpose tree species;
- Establish woodlots, farm strips and boundary marker plantings.

The project has a target of 240,000 hectares of individual plantations.

Photo Set 3 Fuelwood plantations surrounding Addis Ababa – predominantly eucalyptus

3.4.3 Rationalisation Plan for Woodfuel Supply to Addis Ababa

Addis Ababa depends largely for fuelwood on the predominantly eucalyptus plantations surrounding the city[6]. The project focuses on the element of the woodfuel supply to Addis Ababa currently operated by "women carriers". This is estimated to supply 37% of the total woodfuel supply.

The objective of the project is to support the sustainable management and exploitation of the woodfuel plantation stock around Addis Ababa by these women carrier groups.

The project would undertake the following activities:

- Provide training and technical assistance to the women carrier groups, including planting, maintenance and harvesting techniques;
- Support the rationalisation of the transport system;

[6] The first plantations were started in the late nineteenth century when the Emperor Minelik imported eucalyptus to plant in the new capital Addis Ababa.

- Provide training and support for the establishment of urban seedling nurseries and other economic diversification activities for women;

The project would be managed by the Finfine Forest Development and Marketing Enterprise (FFDME) from their present offices.

3.4.4 Improved Stoves - End-Use Energy Efficiency in the Household Sector

The project proposal is based on a whole range of studies and research and design interventions undertaken by a wide range of organisations which have culminated in the design of an improved stove for use by urban and rural households to reduce fuelwood consumption.

A major breakthrough was made by the Cooking Efficiency Improvement and New Fuels Marketing Project (CEINFMP), who carried out a number of surveys, and designed, developed and disseminated a number of proven energy efficiency household energy end-use appliances.

Two of the major achievements of the intervention were the Lakech fuel saving charcoal stove and the Mirt enclosed energy efficient enjera stove.

The improved 'Lakech' charcoal stove, with an average fuel saving of about 25% was developed and is now widely used, with over 1.5 million such stoves currently in use.

However, the majority of the rural communities, and still many urban households use fuelwood not charcoal, and CEINFMP developed an enclosed biomass enjera stove[7] – the 'Mirt' with a biomass fuel saving of 47%-50% when compared to the traditional three stone open. It is estimated that over 324,000 Mirt stoves are currently in use.

The major objective of the projects is the efficient use of biomass fuels in the households. The achievement of this objective will largely depend on the increased use of improved stoves for cooking and baking.

At the initial phase of the program, improvement in the end-use efficiency of enjera baking will be given first priority. As such, improvement in end use efficiency of baking will be largely based on the introduction of the already existing improved enjera baking stove "Mirt". However depending on location specific conditions modifications on the Mirt stove or development of new enjera stove may be necessary.

The stove is made from a cement/sand/pumice or scoria mix.

The project intends to target Tigray, Amhara, Oromia and SNNP Regions. The project will be managed at the regional level through the following institutions8:

- Tigray - the Tigray Energy Bureau a department under the 'Rural Development and Agriculture Bureau', the Department will have two teams that focus on biomass and alternative energy resources., the Department will have about 12 staff;
- Amhara - the 'Rural Energy Development and Promotion Secretariat, the proposed Secretariat will have two departments, and two services. The departments will have teams that will be responsible for the development and promotion of biomass, alternative energy resources and their promotion. The Secretariat is expected to have about 39 staff;
- Oromia - the proposed structure is the Oromia Energy Bureau, Energy Department which will have about 14 staff;
- SNNP - continues to function under the 'Mines, Water and Energy Bureau' under the Ministry of Infrastructure. The Energy sector will have a separate desk at the wereda level. In each wereda there will be one energy staff member, a total of 15 staff in the region.

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[7] Enjera is the staple diet for the majority of the population in Ethiopia, it is a flat "pancake" made from the grain "teff", an endemic cereal crop. Enjera baking with fuelwood accounts for about 40% of total wood fuel use in Ethiopia. Traditional bakers (mitads) are of the open-hearth type with very low efficiencies (less than 10%).

[8] It should be noted that as yet these bureaux are not all fully functional but are expected to be operating in the immediate future.

The project has approached Micro-Finance Institutes (MFI) in the regions for their support. The following institutions have indicated their willingness to support the project as an intermediary providing credit to improved stove producers:

- The Dedebit Credit and Saving Institution (DSCI) of Tigray;
- The Amhara Credit and Saving Institutions (ACSI);
- The Oromia Micro-Finance Institution (OMFI) of Oromia.
- The Omo Credit and Savings Institutions (OCSI) of the SNNP region;

The project has not identified specific sites for intervention, this will be done after consultation with the regions and will be to some extent be determined by the availability of materials - particularly pumice or some similar performance rock material.

The project envisages the following activities:

- Needs identification, using rapid appraisal techniques in localities identified using existing data on supply and consumption of biomass fuels, major end uses and other socio-economic considerations;
- Choice of technology, adaptation and development activities, as far as possible, the existing 'Mirt" enjera stove will be introduced. However if pumice or scoria is not available, then alternatives will be investigated;
- Identification of training needs, in most situation local artisans could be easily trained to develop the necessary technical skill to produce stoves of acceptable quality. Artisans, however, will also be producers and suppliers and hence would need training in small business skills;
- Setting up stove producers' funds, to be administered by the existing micro credit and saving institutions of the respective regions.
- Monitoring and evaluation, the project coordination unit at the Federal level in consultation with regional bureaux will put a set of verifiable indicators for the major activities to be conducted both at Federal and Regional levels.

Figure 1 The "Mirt" improved enjera stove

4 Environmental and Social Impacts

4.1 Urban Distribution

No land acquisition is expected as the work is focused on the rehabilitation of existing urban systems. The installation of transformers is on existing sub-station sites or else pole mounted.

As with Rural Electrification, the extension of the 33 kV and 15 kV lines follows road alignments and again requires no land acquisition. Compensation for crop damage will be made as per the Resettlement Plan.

EEPCO has a set of regulations for the construction of overhead power distribution lines which include details on safety aspects including clearance to buildings, trees and crossings.

The project could have some benefits to cultural heritage as there is some potential for improving the visual aspects of cultural sites in urban areas through more aesthetic positioning of cables and use of underground cables.

Improved power supplies should also reduce the demand for woodfuel and other alternative energy sources.

The planned project is not expected to have any significant impacts that would trigger concerns under the WB Safeguard Policies.

4.1.1 Contaminated Transformers

Polychlorinated Biphenyls (PCB) were widely used as a cooling and dielectric fluid and additive in electric transformers and in large capacitors. PCB is a persistent organic pollutant (POP) that will create negative health impacts or adverse ecological changes even when present in low concentrations.

Intentional PCB production was ended in most countries by 1980 and most transformers and capacitors built after 1980 do not contain PCBs. The major exception to this is transformers and other PCB applications produced since 1980 in the former Soviet Union.

The Stockholm Convention on Persistent Organic Pollutants lists PCBs as one of the 12 target POPs requiring particular attention. This is also reflected in the WB EA Sourcebook update dealing with "Privatisation and Environmental Assessment: Issues and Approaches" (March 1994). This states that the WB considers the use or storage of PCB containing transformers a "red flag".

There is some concern that some of the older transformers being replaced as part of the urban rehabilitation programme may contain PCBs.

This is not an issue with new transformers, as they will not contain PCBs.

4.1.2 Disruption During Construction Works

Clearly there will be some disruption of power supplies as well as disruption to traffic and other road users during rehabilitation. EEPCO has standard procedures (see 3.1) to minimise disturbance, which should be observed. Where OD 4.12 is triggered the World Bank guidelines will apply.

4.2 Load Dispatch Centre

The LDC will be installed within the new EEPCO headquarters building to be constructed in Addis Ababa. This headquarters building will be 25 stories. Construction work is due to start next year.

The impacts of the construction of the headquarters are those of any building works, and include the demolition of some old office buildings, and the construction of new ones. The impacts will include dust and noise, and traffic disturbance from construction vehicles.

However there is no incremental impact from the LDC, as the new headquarters building will be constructed with or without the LDC, and it is not part of this project.

The planned project is not expected to have any significant impacts that would trigger concerns under the WB Safeguard Policies.

4.3 Rural Electrification

The main structural intervention is the erection of the line extension. However, the flexibility in the positioning of distribution poles and the relatively low costs of changing line direction mean that the alignment can be modified to avoid displacing any households, hence avoiding any land acquisition or resettlement of households. However, crop damage will occur during construction and a compensation

plan will be prepared after surveys have been done in accordance with the attached Resettlement Framework.

The final alignment is decided following a line survey and takes account of local conditions, including avoiding disruption to housing, avoiding forested routes, avoiding wetlands or other "problem areas".

The distribution lines can also be routed to avoid any direct or visual impact on cultural heritage sites, such as churches, mosques, archaeological and historical sites and away from any viewpoints or other sites of outstanding natural beauty. The project is not aware of any such sites along planned routes. Should they be encountered when the detailed surveys are carried out they will be avoided. In the unlikely event that a site cannot be avoided an alternative source of supply, such as through local generation, will be adopted.

The project is also not aware of any protected areas or areas of special biological significance that are on the proposed line alignments [9].

The project should reduce the demand for woodfuel and other alternative energy sources in the rural areas.

4.3.1 Crop Damage during Line Construction

The planned routing of distribution lines follows the rural road systems. The poles are erected near the edge of the road, and can be sited to avoid any needs for resettlement. However, much of the land along the line alignment is farmland and during construction there will inevitably be some crop damage.

The planned project is not expected to have any significant impacts that would trigger concerns under the WB Safeguard Policies on, forestry or indigenous peoples, and impacts on cultural heritage and natural resources would be non -existent through line routing. The policy on resettlement (OP4.12) will be triggered due to crop damage during construction, for which a Compensation will be made. Resettlement Framework has been prepared, based on which a Resettlement Plan will be prepared after surveys have been carried out and before construction commences.

4.3.2 Greenhouse Gas Emissions

The direct impact of the project will be to reduce greenhouse gas emissions through replacing some of the local biomass energy use with electricity generated primarily through hydropower.

The distribution lines run along the edges of existing rural access roads. During construction there is little requirement for clearance of vegetation, particularly where crossing farm or grassland. In areas where the vegetation at the edge of the road is bushland or forest and re-routing is not an option, there is a need for some vegetation clearance, however this rarely affects a strip of more than two or three meters.

During operation in bushland or forest areas, maintenance will be carried out to prevent trees from growing into the lines. Clearance of vegetation and ROW maintenance is done by hand. Line inspection and maintenance is carried out once or twice a year.

While clearly there will be some emissions from cleared vegetation, all useable woody biomass will be collected by local communities and substituted for their normal woodfuel supplies.

4.3.3 Bird and Power Line Interactions

Ethiopia is recognised as one of Africa's bird hotspots with over 850 species recorded of which around thirty species are endemic[10]. It is also worth noting that there are over 200 paleartic migrants and many

[9] However, many "protected areas" have been subject to major encroachment and while still having formal protected status, may not be locally considered as protected. Conversely there are a few key remnant forest areas that are known to be of high biodiversity significance, but these can only be identified at the time of detailed line survey.

[10] There are 17 species endemic to Ethiopia and a further 13 species restricted to the geographical region of the Ethiopian Highlands, which includes parts of Eritrea.

of these have breeding populations in Ethiopia. Key areas include the wetlands and the rift valley migratory routes. The main source of information on bird populations is the Ethiopian Wildlife and Natural History Society (EWNHS) who have been identifying "Endemic Bird Areas" and "Important Bird Areas".

In some parts of the world, bird collisions with power lines has become a significant issue, both to environmentalists concerned with threats to rare and endangered species, and to the power companies as these encounters with power lines can cause power outages.

While there is as yet no experience of bird deaths being a significant problem in Ethiopia, it is a potential localised problem that may occur with an expansion of the distribution lines.

There are two main causes, large low flying birds physically flying into power lines and raptors and other large birds perching on distribution lines and touching across uninsulated conductors. In the majority of cases the problem is relatively localised, where a distribution line crosses a specific bird flight path, such as a valley between a wetlands area and roosting areas or feeding areas.

4.4 Community Based Sustainable Natural Forest Management

Site specific project interventions will be developed as part of the project. This includes the evaluation of specific forest interventions and the identification of community stakeholders and user groups.

The World Bank update on public involvement[11] emphasises the need for public participation in the design and implementation of all community based development projects. This will become a specific component of the project once detailed planning is initiated at the regional level.

The project is not expected to involve any resettlement or any loss of access to natural resources other than that agreed to as part of the forestry management plans developed with the communities. The final objective is that the ownership of the forests will be legally transferred to the communities. The areas of intervention of the project are circumscribed to "patch" forests in open access status. The very few remaining blocks of forest stocks in the country will not be covered by the project. The extremely low demographic density of rural Ethiopia further accounts for a generalized inexistence of land use conflicts in the country. Under the prevailing sectoral legal and regulatory framework, once a community or individual farmer plants a given patch of land with trees, they automatically acquire the ownership of the trees and users right for as long as there are trees in the plot.

The preparation of the detailed field intervention methodology and procedures will be undertaken as part of the initial project implementation activities. The World Bank's guidance and technical support will be solicited at the appropriate time. Community- based or Farmers Association-based natural resource management schemes are not new in Ethiopia. PRA will be conducted including best practices derived from "Community Action Programs" and other Bank and non-Bank participatory activities. (The Bank staff in charge for the designing of this component is the Team Leader of the Senegal Sustainable and Participatory Energy Management Project, which is a "flagship" activity in community based participatory natural resource management system/schemes).

The project supports the WB operating principles on natural habitats and forestry and addresses concerns on gender and participation. The project is not expected to have any specific indigenous people issues as the stakeholder process will ensure inclusiveness.

The planned project is not expected to have any significant impacts that would trigger concerns under the WB Safeguard Policies.

4.4.1 Invasive and Exotic Species

The project proposal includes enrichment planting, boundary planting and expansion planting as being possible tools that will be used to restore and manage natural forests. The project is proposing to raise 550 million seedlings in 50 community nurseries.

[11] Public Involvement in Environmental Assessment: Requirements, Opportunities and Issues October 1993.

The project document does not specify what species will be raised in these nurseries, but to avoid possible bio-pollution from invasive or exotic species, the nurseries should produce indigenous species for the natural forest areas.

4.4.2 Indigenous Peoples and Gender Bias

The project is not aware of any indigenous people that would be negatively affected by the proposed development. The project recognises the multiple uses of forests and the initial stakeholder consultation process will identify any minority groups and ensure that they are included in the consultation process.

The project specifically recognises the key role of women as resource users and states "... *women should be the focal point in this programme*".

4.5 Micro/Small Scale Agro-forestry

The proposed interventions are in support of the programme to conserve natural forests, Although not an objective of the project, this component will facilitate, gradually, the production of additional forest products, thereby providing economic and social opportunities for the local population to increase its standard of living. No sudden or dramatic changes other than those positive ones that will result from the gradual reforestation are expected to occur. Under most circumstances this level of intervention would not require any environmental assessment.

The project supports the WB operating principles on natural habitats and forestry and addresses concerns on gender and participation.

The planned project is not expected to have any significant impacts that would trigger concerns under the WB Safeguard Policies.

4.5.1 Invasive and Exotic Species

The project proposes to support the development of 2,200 individual on-farm nurseries and encourage a range of on-farm interventions.

Therefore the concern on bio-pollution of the natural forests areas is limited. However there is still a risk from deliberate or accidental transfer of seeds or other planting materials.

This can be minimised through choice of on-farm species.

4.6 Rationalisation Plan for Woodfuel Supply to Addis Ababa

No detailed project documents are available from FFDME, however again this project supports WB principles on participation and gender, reduces pressure on alternative sources of fuelwood and provides for economic diversification.

Under most circumstances this level of intervention would not require any environmental assessment.

The planned project is not expected to have any significant impacts that would trigger concerns under the WB Safeguard Policies.

4.7 Improved Stoves

This project component will promote the manufacture of improved stoves by local artisans. The project will be managed through local institutions with funds directed through existing MFIs.

The technology relies on the use of readily available local materials, sand, pumice or scoria and cement. The demand for these materials is not likely to have any locally significant impacts. The use of "foreign" materials (such as new or recovered metal sheets) is not an option due to unavailability and extreme high cost of those material, and the huge cost of transporting such materials from Addis Ababa to the secondary urban centers and rural areas.

The project would have a positive impact on natural habitats and forestry through reducing demands for fuelwood, and also a direct gender bias as the collection of fuelwood is typically a major women's labour component.

Under most circumstances this level of intervention would not require any environmental assessment.

The planned project is not expected to have any significant impacts that would trigger concerns under the WB Safeguard Policies.

5 Analysis of Alternatives

5.1 Urban Distribution

5.1.1 No Development

It is clear that the present urban power distribution systems are in a state of severe disrepair.

The option of no action is unacceptable to the supplier and the consumer. Increasing degradation of the system will lead to consumers opting for additional or alternative energy sources. For business users this has led to the installation of generators at a direct cost to the economy and increasing the reliance on fossil fuels.

At the household level, many of the smaller households still rely on woodfuel for cooking and heating. Any further degradation in services will escalate this demand, putting ever greater pressure on the woodlots and natural forests supplying the major urban centres.

5.1.2 Alternative Energy Sources

The rehabilitation of the existing system does not preclude the introduction of alternative or supplementary energy sources or energy saving technology. However, at present there are no widely or economically available systems that can entirely replace the existing systems at household level or industrial level. It is worth noting that UNEP/GEF are to support a regional programme to develop commercial solar PV systems in East Africa, covering Tanzania, Uganda, Kenya, Ethiopia and Eritrea.

5.2 Load Dispatch Centre

There are no direct negative environmental or social impacts associated with installing the load dispatch centre. The load dispatch centre should make energy management more efficient and reliable. The option of no development is an extension of the current status of power and load management within EEPCO.

5.3 Rural Electrification

As part of the overall economic development strategy for Ethiopia EEPCO is implementing the Five Year Sector Development Programme. The five year programme is aimed at increasing the electricity generation, transmission and distribution capacity in order to meet the forecast demand.

At present an estimated 96% of the primary energy supply comes from fuelwood, charcoal and crop residues traditionally used by the majority of the population. The present patterns of consumption of woody biomass are unsustainable. The growing population exerts pressure on already degraded forests leading to further deforestation.

Meanwhile, Ethiopia is in an enviable position in regards to power production, with an estimated hydropower capacity of 30,000 MW, of which only a small part is currently used. It is in response to this that the rural electrification programme has been developed.

5.3.1 No Development

The present patterns of rural energy consumption will continue with increasing environmental and social costs, as woodfuel becomes rarer and therefore more difficult to obtain.

This is not considered to be an option, although electrification is only one component of the broader approach to energy management, as demonstrated by the other components of the proposed project dealing community based natural forest management, agroforestry and improved stoves.

5.3.2 Diesel Generation

An alternative would be to install diesel generators in rural centres. This has been done in some villages/towns with specific requirements, and will continue to be an option considered for more remote areas where the cost of installing distribution lines would be too expensive.

However, in all the weredas within the current programme, the economic costs of diesel generation would be higher than the proposed ICS.

In addition, diesel generation relies largely on the continued importation of fossil fuels, increases road traffic through fuel deliveries, and has other negative impacts including air and noise pollution.

5.3.3 Alternative Generating Systems

The Austria Development Agency has committed funds to supporting the feasibility study and construction of three mini/micro hydropower stations for rural electrification. While this clearly may be an option for certain areas with appropriate water resources, it has limited applicability for most of the country.

Solar power, wind generators and biogenerators also have some limited applicability, but are clearly not an immediate solution to the problem of rural electrification.

5.4 Community Based Sustainable Natural Forest Management

5.4.1 No Development

The present situation is one of increasing degradation of forest resources, estimates for the proposed project area are of an annual loss of around 42,000 hectares. This is partly due to the lack of management capacity as well as pressure on resources. The option of no development will result in the continued loss of these resources with economic impacts on local communities, as well as loss of natural habitats and biodiversity.

5.4.2 Demarcation of Forest Boundaries and Management by the Forest Department

The classic approach to forestry taken in many countries has been management by a local authority body, such as a forestry department. This was previously the situation in Ethiopia. However this approach was not applied to the "fragment" forests which were left effectively un-managed due to lack of capacity, and have continued degrading.

Even where forestry departments tried to manage natural forests, the multiple use of these resources by local communities generally continued and often led to conflict between communities and local authorities.

The present trend in natural forest management is to devolve part or all of the management responsibilities along with access rights to local communities. This has been shown to be successful in parts of Africa, including Tanzania and Ghana. However, it is understood that there is as yet little experience of this in Ethiopia.

5.5 Micro/Small Scale Agroforestry

5.5.1 No Development

Although agroforestry is already an existing component of the local farming systems, it has not been widely or systematically adopted, and the existing situation is one of continued degradation of the natural forest resources.

The general pattern is for agroforestry to only be commonly adopted as part of a farming system when all other free alternative wood resources are lost.

The option of no development will result in the continued loss of natural forest resources with economic impacts on local communities, as well as loss of natural habitats and biodiversity. It will also result in a continuation of the present situation of escalating erosion and loss of soil fertility.

5.5.2 Promotion of Alternative Species

This is discussed under Environmental and Social Mitigation.

5.6 Rationalisation Plan for Woodfuel Supply to Addis Ababa

5.6.1 No Development

The "women carriers" are already a recognised stakeholder in the management of fuelwood resources round Addis Ababa, however the present management system is relatively uncontrolled and considered unsustainable.

The option of no development will result in a continuation of the present fragmented management system, with the gradual degradation and/or loss of fuelwood resources around the city. .

5.6.2 Fuelwood Plantation Management by Local Authorities

As previously discussed under community management of natural forests, local authorities are rarely provided with the manpower or financial resources to effectively manage forest areas or "protect" them from use by local communities. This has been recognised as a major constraint, and as a result is not considered as a general management option.

The "women carriers" are already recognised stakeholders in the provision of woodfuel.

5.7 Improved Stoves

5.7.1 No Development

There is already some considerable interest in the use of improved stoves, however the uptake of this technology is limited by availability.

The option of no development will delay the widespread uptake of this technology and hence prolong the present situation of fuelwood shortages.

5.7.2 Alternative Energy Sources

The present pattern of energy consumption is clear. The vast majority of households depend on fuelwood and other biomass resources. Injera baking accounts for 40% of the total fuelwood use in the country.

This is particularly the case in rural areas, where electricity supplies are limited and kerosene is beyond the means of most households.

The government is promoting all options for energy substitution, but biomass will clearly remain the major energy source for most households for some considerable time into the future.

6 Environmental and Social Mitigation Plan

The environmental and social mitigation plan only includes those components where mitigation measures are called for to address negative impacts. The plan therefore does not include the installation of the load dispatch centre, the rationalisation plan for woodfuel supplies to Addis Ababa or support to the regional production of improved stoves.

A Resettlement Framework has been prepared in connection with the Urban Rehabilitation and Rural Component and will be the basis on which the Resettlement Plan will be prepared when the line routes have been surveyed and before construction begins. The Resettlement Framework provides for monitoring and evaluation and a grievance resolution mechanism.

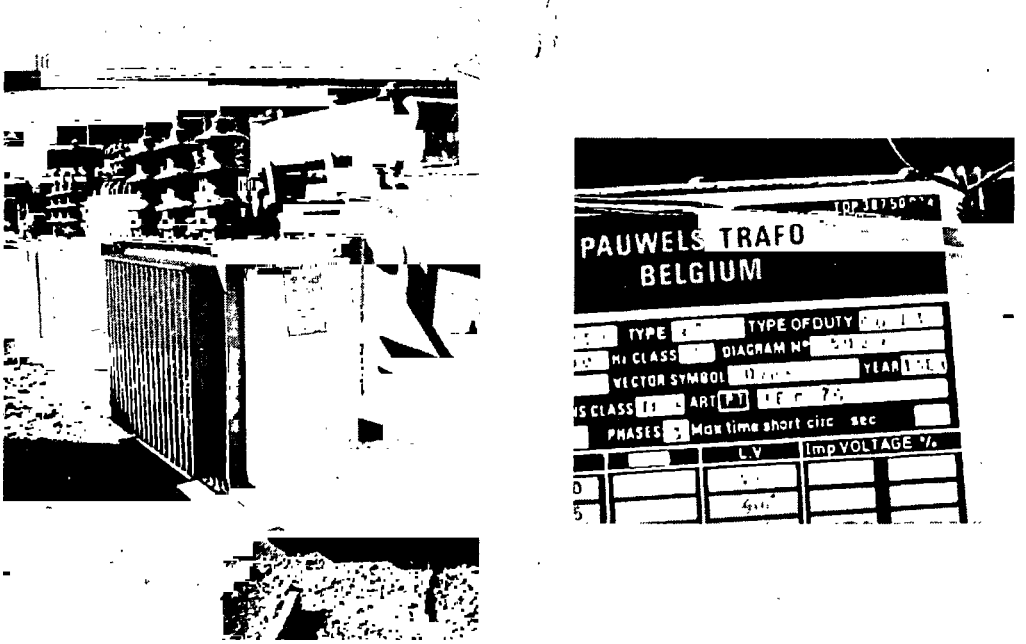
6.1 Urban Distribution

6.1.1 Safe Disposal of Transformers

Given the concern that some of the older transformers may contain PCB contaminated oils, EEPCO will carry out an audit of the transformers being replaced.

This is a simple task, as all transformers are tagged with their manufacturing details, including year of manufacture. The original specifications can then be checked to see if PCBs were ever used in the systems.

Photo Set 4 Scrapped transformer with tag showing provenance and date of manufacture



In the event of identifying any contaminated equipment, EEPCO will approach UNDP/UNEP to ensure that the latest specifications for the safe disposal of PCB contaminated materials are complied with and included in any subcontract for removing and disposing of equipment.

6.1.2 Planning and Management of Construction Activities

As previously stated, EEPCO have regulations on the construction of power distribution systems designed to ensure that the installations do not pose a risk to public safety following commissioning or to the construction crews during erection.

EEPCO will inform consumers of scheduled power interruptions and where possible will arrange back-up power supplies through alternative lines. Where there is the likelihood of traffic disruption in areas of high traffic, work will be carried out during weekends and holidays, and measures will be taken to ensure the safety of people and animals, such as the erection of fences and displaying CAUTION and DANGER notices.

Lines will be re-routed to avoid sites of cultural heritage or other visually sensitive sites.

6.2 Rural Electrification

The main mitigation measure is built into route alignment. This is modified at the design stage to avoid the need for any land acquisition, resettlement, or any interference with cultural heritage or natural habitats.

Before starting detailed line survey, EEPCO will consult the key stakeholders to see if they are aware of any potentially sensitive habitats or protected areas that may be affected by the route. These include:

the state authorities, the EPA, the Ministry of Agriculture Natural Resources Department, the Institute of Biodiversity Conservation and Research and the Ethiopian Agricultural Research (forestry), the Ethiopian Wildlife Conservation Organisation (protected areas) and the Ethiopian Wildlife and Natural History Society (birds and sensitive habitats).

6.2.1 Concrete distribution Poles

The present proposal is to use concrete poles, rather than timber ones, avoiding adding to the pressure on scarce wood resources. In addition the designs specify special foundations in areas with unstable soils, to prevent movement of the poles, minimising the risk of poles falling over and presenting a hazard to humans and livestock, as well as limiting power-outages, and maintenance or repair costs to EEPCO.

6.2.2 Protection from Bird Collision and Electrocution

There are two main approaches to dealing with the issue, design and insulation of distribution lines and attaching "flappers" to the lines so that they can be more easily seen and avoided in flight.

Research carried out on different pole configurations has shown that the arm-less compact construction design is regarded as being the safest. EEPCO have stated that they can use this design as opposed to the more standard cross arm.

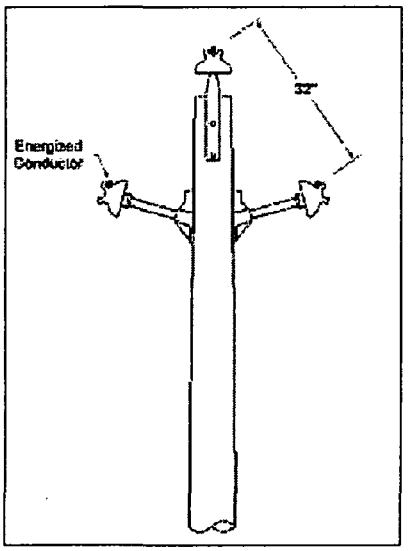


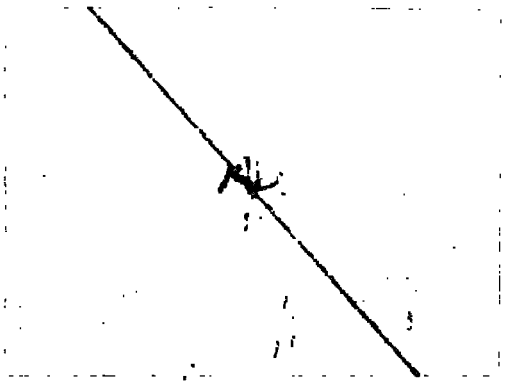
Figure 2 Recommended Compact Arm-Less Pole Configuration

However even with the arm-less compact design, raptors flying in to land on one of the short support brackets can contact both of the lower phase conductors at the same time. Mitigation methods used include increasing the distance between phase conductors and installing moulded plastic insulation on conductors.

However these problem tends to be localised, and work in the United States has shown that 95% of bird deaths can be avoided by adapting 2% of the distribution poles.

Increasing the visibility of the line can reduce the second problem of bird flight collisions. ESKOM in South Africa have developed appropriate systems that can be fitted to live lines if a problem flight path zone is identified.

Photo Set 5 Bird Flappers attached using live line link stick



If there are any concerns about possible bird/power line interactions in a particular area, EEPCO will contact the EWNHS and arrange for an evaluation of the problem. EEPCO will inform local communities to report power line bird deaths if they occur.

6.2.3 Compensation for Crop Damage during Construction

EEPCO have a policy to pay compensation for crop damage, and for planning purposes have used a value of $115 per kilometre of line (2001 value)[12]. The evaluation of the 36 wereda covered by the African Development Fund produced a figure of $290,000. Based on these figures, EEPCO should include a budget of $800,000 for compensation. The proposed compensation plan is attached.

EEPCO will update the compensation estimates in consultation with village committees, and pay compensation before the construction of a particular distribution line.

6.3 Community Based Sustainable Natural Forest Management

6.3.1 Community Participation

Once the region has initiated this project and the key intervention sites have been agreed, the project should immediately start the process of participation. This should include participation in the evaluation of the resources, not only as respondents to socio-economic and natural resources surveys, but actively in the design and implementation of these surveys.

The project must develop a consultation plan, which should incorporate the following:

- Build capacity for consultation, bringing in NGOs and consultants with previous experience to help the project staff;
- Identify stakeholders and ensure that minority /disadvantaged groups are included;
- Use a variety of consultation techniques to ensure that all stakeholders are fully able to express their concerns;
- Ensure that the concerns of the stakeholders are reflected in the detailed project design;
- Include local NGOs and recognised CBOs in the consultation process;
- Reach community consensus before implementing any hillside forest closures;

6.3.2 Use of Indigenous Species

As part of the evaluation carried out in deciding on the rehabilitation treatments suitable tree species for regeneration and enrichment planting will be selected. The focus will be on indigenous species found in each specific forest area, or are known to have occurred there in the past.

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[12] Assuming a maximum width of disturbance of 3 meters, this would be equivalent to around $400 per ha, if the entire area were under crops.

However the following indigenous species are recognised as having particularly high value: *Aningeria adolfi-frederici, Cordia africana, Hagenia abysinica, Pygeuim africanum, Acacia spp., Podocarpus gracilior, Syzygiem guinense, Chlorophola excelsa, Manacra butigi, Croton macrostachys, Olea spp. and Ficus spp.*

The project should contact the Institute of Biodiversity Conservation and Research and the Ethiopian Agricultural Research Organisation (Forestry) for support in identifying any particular rare or endemic species that would require special attention.

6.4 Micro/Small Scale Agroforestry

6.4.1 Selection of Appropriate Tree Species

The project proposal lists the following species as being possible choices for on-farm planting:

- Homestead/Woodlot fuel and construction wood, bee keeping shade and medicine - *Eucalyptys spp., Hagenia, Juniperus, Podocarpus, Sesbenia sesbaen, Millitia ferruginea. Cordia, Acacia spp;*
- Agroforestry with cereal crops and livestock - *Acacia albida, A. Nilotica, A. decurrent, A. melanoxylon, A. saligna, Cordia abyssinica, Croton macrostachyus, Hagenia abyssinica, Albiza gummifera, A. lebek, Podocarpus falcata, Juniperus procera, Pygeum, Olea, Ficus spp. Milletia ferruginea, Leucaena leucocephala, Persea americana, Zizisiphus spp., Balanites aegyptica, Tree luceen, Sesbania, Azadirachata indica, Shinus molle, Grevillea robusta,*
- Boundary Planting for boundary security, firewood and bee keeping and for erosion control - *Eucalyptus spp., Casuarina spp., Cupressus spp., Podocarpus gracilior, Olea africana, Acacia decurrens, Acacia abyssinica, Juniperus procera, Vernonia amygdalina.*

The majority of these species area already present in the area, however again the project should consult IBCR and EARO to see if these species pose any threats to natural habitats, or whether there are more local/indigenous species that should be included as part of the proposed seed distribution.

7 Environmental Management and Training

An Environmental Management Plan (EMP) outlines the mitigation, monitoring and institutional measures to be taken during project implementation and operation to avoid or control adverse environmental impacts and the actions needed to implement these measures. Establishment of an Environmental and Social Management and Monitoring Work Unit in EEPCO

At present EEPCO provide specific environmental and social support to the Gilgel Gibe hydropower project. The project Environmental Monitoring Unit has a social development adviser, along with a forester and an environmental sanitation adviser.

However, there is no central capacity to support the development and implementation of their power projects. This also means that EEPCO is not in a position to respond effectively to any unforeseen environmental or social issues that may arise from their existing operations or from planned interventions.

Given that EEPCO is in the process of initiating another major expansion of power facilities, it is recommended that EEPCO establish a central Environmental and Social Management and Monitoring work unit.

This is also in line with the national Environmental Assessment Guidelines and Draft Proclamation on Environmental Impact Assessment, which make the proponent responsible for presenting information to the EPA.

7.1 Provision of Community Participation Training

A single Project Focal Unit (PFU), established in the Ministry of Agriculture will manage the two forestry interventions in SNNP. The Regional Steering Committee will delegate the implementation of the programme to the PFU.

The PFU will be headed by a senior forester as project coordinator, with two forestry specialists one for on-farm plantation and one for natural forest management. Additional staff will be contracted to work

with the project. The project will be implemented through the existing extension network of Development Agents (DA) of the Bureau of Agriculture, supported by professional officers at the zonal level.

The emphasis in both interventions is "community participation", emphasised even more strongly in the natural forest management component "community ownership". Both components are also directed as a priority specifically at women.

Both projects include "training of trainers" and the implication is that this will include training in community management.

However, this will be a new approach to the management of forest resources for BoA staff. Much of the early work includes the socio-economic evaluation of demand and use patterns. This will need to be a participatory exercise. Participation is then ever more critical if the project is to be successful and it has been recommended above that the PFU develop a specific consultation plan from the very start of the project.

Given this emphasis, it is recommended that the PFU recruit at least one social forester and one community development adviser from the start, and ensure that all staff involved in the project receive training through formal courses and workshops in consultation, community participation and community management.

However, although this may be a new approach for the forestry sector in Ethiopia, community management is not a new approach in all sectors and the PFU can call on other sectors and NGOs with experience of community managed projects and agroforestry. Possible NGOs include FarmAfrica and Mënschen fur Mënschen.

8 Mitigation and Monitoring Plan

As discussed in the previous sections, the project will not have any adverse environmental impacts. The following plan summarises the actions that should be taken to mitigate other possible impacts, as discussed in the relevant sections above.

8.1 Urban Distribution

The key environmental concern is the possible need to dispose of PCB contaminated transformers. EEPCO will ensure that they and their subcontractors record the details of all replaced transformers. This list will be checked against the original manufacturer's specifications and the EEPCO transformer maintenance records. If any transformers are suspected of PCB contamination, then EEPCO will immediately contact the World Bank and UNDP/UNEP for the latest recommendations on safe disposal of contaminated oils and equipment. EEPCO will supply an updated list showing make, model, and date of all replaced transformers to the World Bank along with any information on whether PCBs were used in the original design or during maintenance. *The contract document for this contract package will specify the required procedures*

EEPCO will report on any particular design modifications used during rehabilitation to protect the visual amenity of cultural heritage sites or other special sites.

EEPCo will observe its safety guidelines for overhead line and underground cable work to ensure safety of people and animals and to minimise disruption to traffic. Where possible alternative power supply routes will be used to maintain supply to consumers during construction. Where alternative supply is not possible, the consumers to be affected will be informed in advance that their supply will be disrupted.

8.2 Rural Electrification

The key mitigation factor is line alignment. Prior to starting construction EEPCO carries out a line survey and prepares a map showing the routing and estimating quantities so that a contract can be drawn up. The line survey also records any areas where vegetation needs to be cleared. EEPCO will specifically record where the line route has been realigned to avoid a protected area. The contract also specifies the type of distribution poles to be used and the configuration of the arm and insulators. According to the EA recommendations these should be concrete poles, and a compact arm-less pole configuration. The contract will also specify the conductor.

Before starting on the detailed line survey, EEPCO will notify the various stakeholders including the EPA, EWNHS, IBCR and EARO to see if they are aware of any "Environmentally Sensitive Areas"[13]. that may be affected by the route. If there is any concern then the relevant organisation can arrange for a site visit and advise EEPCO on possible problem areas and the potential for alternative alignments.

As an additional requirement EEPCO will record any areas where there is a potential for the alignment to affect the visual amenity of a cultural heritage site and indicate its suggested realignment. Following this consultation process, this information along with the map of the selected routing will be passed to EPA for approval of the realignment.

A copy of the map with the additional information will also be passed to the World Bank.

Following construction EEPCO will report on all compensation payments associated with the line.

EEPCO will update the compensation estimates in consultation with village committees, to ensure that there are in line with prevailing replacement values (see Resettlement Framework), pay compensation before the construction of a particular distribution line, and check to see whether or not the damage exceeded that envisaged, after the work is done. Any extra damage will be compensated. The total estimated compensation cost of US$800,000 will be budgeted under the project

EEPCO will report on any recorded bird deaths and indicate on a map where these have occurred. Should any hotspots be identified, then EEPCO will report these to the EPA and propose appropriate interventions, which may include the localised installation of bird flappers or arm/line insulation.

8.3 Community Based Sustainable Natural Forest Management

Following the start of the project the PFU is required to prepare a consultation plan. This should be both outline and specific to communities. This plan should be passed to the World Bank to confirm that it conforms with the guidelines on public consultation and disclosure.

The project should keep records of all public consultation activities and these should be available for appraisal by the WB if required.

The second concern was with the capacity of the existing staff to effectively manage the participatory planning and management process, and the project includes training to support this. The development of participatory local forest management plans will be directly done at the Woreda level, and specific participatory management plans will be developed by and for each group of 5 farmers Associations with TA from the Bureau of Agriculture of the respective Woreda. The elaboration of those participatory plans has been scheduled as the starting intervention in the field and sufficient resources (approx. US $1.2 million) have been allocated to underwrite the mobilization of the necessary Federal-, Regional- and Woreda-level TA. As an indication of the level of community participation that is expected, the economic value of beneficiary participation (calculated on the basis of beneficiary's labour inputs) has been estimated at close to **50%** of the total investment cost of the component. The World Bank's guidance and support should be requested at the beginning of this phase.

The final objective is the legal transfer of forest land to communities. The "process" for doing this has not yet been established. However, the PFU will provide copies of legal documents along with supporting documents indicating community rights, responsibilities and management plans, as these are prepared.

As previously indicated the PFU will confirm that the proposed planting species are appropriate for the specific forest areas, and confirm this with the Institute of Biodiversity Conservation and Research. The PFU will keep records of all species raised in the community nurseries and distributed to forest areas. This information will be provided to the Institute and be available to the WB if required.

8.4 Micro/Small Scale Agroforestry

This project is jointly managed with the Natural Forests project under the PFU. While the interventions are different much of the community participation process will overlap. The consultation plan

[13] Listed in their schedule as areas which harbour protected, threatened or endangered species, areas of particular historic or archaeological interest, primary forests, wetland of national or international importance, National Park and protected area.

described above and the training in participatory techniques are therefore also applicable, as are the reporting requirements.

One of the main direct project intervention is the support of individual nurseries. As indicated in the mitigation plan, the PFU will ensure that no undesirable species are promoted.

The PFU will confirm that the proposed planting species are not recognised as invasive or weed species and are appropriate for on-farm planting, and confirm this with the Institute of Biodiversity Conservation and Research. The PFU will keep records of all species raised in the individual nurseries. This information will be provided to the Institute and be available to the WB if required.

9 Interagency and Public/Private Sector/NGO Involvement

This section only deals with Interagency and Public/Private Sector/NGO Involvement in environmental management. It does not make recommendations on general cooperation requirements for project implementation.

9.1 Power Projects

The lead agency is EEPCO, responsible for the design and construction of all power installations, either directly or through contractors. EEPCo will establish Environmental and Social Monitoring unit under General Manager Office, who will then become the main link with the following organisations:

- UNDP/UNEP, to ensure the safe disposal of any PCB contaminated transformers.
- EPA, to confirm that the distribution route plans will not affect sensitive areas before construction starts.
- EWNHS, to advise on sensitive bird areas and alternative routes.
- EARO and IBRC to advise on any sensitive forest areas and alternative routes;
- EWCO to advise on any protected areas and alternative routes.
- Local Wereda Committees, these are formed before construction starts and include the wereda authorities, community elders and EEPCO staff. One key role is to agree on acceptable compensation rates for crop damage during line erection. Compensation will be based on prevailing replacement values (see Resettlement Framework)
- Ministry of Agriculture (Natural Resources), if there are concerns that a particular routing will affect critical natural habitats, to propose solutions along with the EPA.

US$100,000 will be budgeted under the project for establishing the unit, and US$100,000 for capacity building.

9.2 Natural Forests and Agroforestry

The lead agency is the Ministry of Agriculture Natural Resources Management and Regulatory Department. The PFU will be formed at this level and deal with environmental issues with the following organisation:

- Regional Steering Committee, the PFU will report to this committee on project implementation.
- Institute of Biodiversity Conservation and Research, confirming the acceptability of species for use in natural forests and on-farm planting.
- Ethiopian Agricultural Research Organisation, again confirming the acceptability of species for use in natural forests and on-farm planting.
- NGOs and other agencies, to provide support in training in participation techniques and community management.

US$200,000 will be budgeted for this component

9.3 Rationalisation Plan for Woodfuel Supply to Addis Ababa and Improved Stoves

Neither of these two components is expected to have any significant negative environmental or social impacts. There are therefore no specific recommendations for linkages with other agencies to manage environmental aspects of the projects.

References

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ADF Appraisal Report – Rural Electrification Project Federal Democratic Republic of Ethiopia October 2001

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Electrocution of Raptors on Power Lines - http://www.dcaccess.com/~gnealon/electric.htm

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Feasibility Studies for Distribution Line Extensions (Various) EEPCO

Project Document on Plantation Development and Management of Natural Forests in Southern Nations, Nationalities and Peoples Regional State (Draft Document) NRMRD Addis Ababa December 2001

Regulations for Construction of Overhead Power Distribution Lines EELPA 1988

Renewable Natural Resources Profile Ethiopia – Natural Resources Institute / Overseas Development Administration, UK 1996

The Environmental Assessment Sourcebook & EA Sourcebook Updates - The World Bank 1991 onwards

World Bank Disclosure Policy Revisions Matrix (August 2001)

World Bank Policy on Information Disclosure – Discussion Draft, Operations Policy and Strategy September 2000

Appendices

Contact List

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Dawit Kidane	FFDME
Abebe Demissie	IBCR
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Million Bekele	NRMRD
Kiflu Segu	WBISPP
Alemayehu Mamo	WBISPP
Youssuf Hadji Ali	World Bank

Protected Areas

The majority of protected areas now fall under state authorities. The Ethiopian Wildlife Conservation Organisation, which used to be the agency responsible for all protected areas now only deals with Awash and Yagudi-Rassa National Parks and Babille and Sankalle Sanctuaries.

The management of protected areas by state authorities is very variable, and tends not to be a high priority.

As an example, Nechisar National Park in SNNP is threatened by heavy resource use including rapid clearance of trees for fuel and construction in the nearby town of Arba Minch, it is also heavily grazed by domestic livestock and open to illegal fishing. In 1998 a major fire caused extensive damage.

Even commercial hunting in the Controlled Hunting Area has virtually ceased, as the concessions are of little interest as the wildlife populations are so low.

National Parks

Awash; Simien Mountains; Abijatta-Shalta Lakes; Omo; Mago; Nechsar; Bale Mountains; Yangudi-Rassa; and Gambella.

Sanctuaries

Yabello; Babille; and Sankalle.

Reserves

Tama; Chelbi; Bale; Awash West; Alledeghi; Gewane; Mille-Sardo; and Shire.

Controlled Hunting Areas

Dabus Valley; Akobo; Jikao; Tedo; Omo West; Murle-Kenya Border; Borana; Bale; Arsi; Chercher and Arba Gugu; Lower Wabi Shebelle; Awash West; Afdem-Gewane; Erer-Gota; Maze; Boyo Swamp; Segen; and Mizan.

Sample Rural Electrification Schemes

In addition to the recently completed rural line extension from Fitche to Gohatsion, described in Photo Set 2, ten extensions were selected from the list of proposed towns for further study:

Amhara Region: Nefas Mewcha, Gashena and Akat

Oromia Region: Saja, Natri and Dobi

SNNP Region: Hadow

The key characteristics are as follows

No land acquisition required for any line; None of the lines pass through protected areas or know significant wildlife habitats; None of the lines pass recognised sites of cultural heritage; All lines follow road alignment and no land clearance is required; Crop damage compensation will be negotiated at the time of mobilisation

Town	Line Extension km	Population	Projected Electricity Uptake	Number of Businesses
Nefas Mewcha	2.5	15,000	60%	160
Gashena	2	4,000	60%	50
Akat	5	2,000	40%	20
Butajira	1	27,750	75%	270
Wolkitie	2	20,000	75%	160
Gubre	10	2,000	40%	18
Hadow	14	2,500	40%	5
Saja	0.5	7,500	40%	10
Natri	0.5	4,200	40%	10
Dobi	0.5	1,575	40%	10