

## **CHAPTER 9 TELECOMMUNICATIONS NETWORK PLAN**

### **9.1 Basic Concept of Network Plan**

The new network is designed in consideration of the latest technology, and possible to interface with the conventional network. The network in future is equipped with ICT oriented composition. The new network will be constructed overlay configuration with existing PSTN. IP network does not use telephone exchange applying technology of packetization. It is foreseen that IP network will be adopted in many countries from now on.

### **9.2 Fundamental Technical Plan**

#### **(1) Numbering Plan**

Numbering plan is expanded taking the introduction of new services and the future open market into consideration. As for the numbering of VoIP, the alternative plan is proposed.

#### **(2) Signaling Plan**

Signaling will be unified to CCS No.7 by year 2010.

#### **(3) Synchronization Plan**

Master Clock is located in Addis Ababa TR-III, which is extended to 3 networks of fixed-phone, mobile-phone and data service network.

Sub-Master Clock is recommended to be installed at the 2<sup>nd</sup> international gateway switch in Nazareth.

#### **(4) Routing Plan**

Considering high traffic loading on key nodes, direct LE-LE routes are introduced, and the heavy traffic on the backbone route is to be branched to the new IP network.

#### **(5) Technical Standard for “Point of Interface”**

Considering that the network will be opened to New Common carrier (NCC), “Points of Interface” are to be made clear at TS, LS and subscriber levels, so as to demarcate the revenue and the responsibility of ETC and NCC.

### **9.3 Public Switched Telephone Network**

3 networks of the fixed, mobile-phone and the small IP network are under operation. Replacement of the majority of the analogue switches with digital ones is scheduled in the short-term plan.

### **9.4 IP-based Network**

IP network is proposed in the Master Plan, including IP routing plan up to the year 2020.

IP network covering 6 tandems and 8 PC is to be established under the short term plan.

## **9.5 Universal Service**

M/P intends to satisfy the universal service requirements of;

- 1) “Tele-access” : telecommunications facility available within the walkable distance (within 10 km)
- 2) “Multi media” : not only the telephone but also internet, data communication (256 kbps)
- 3) “Economical solution” : Cheapest system of the initial cost as well as the annual running cost

DRCS with wide band IP network solution is selected upon due consideration on the key requirement.

The target implementation plan shows;

- |           |                      |                                     |
|-----------|----------------------|-------------------------------------|
| Phase I   | (upto year 2005/06): | 700 PCO sites (Tele-access 13.4%)   |
| Phase II  | (upto year 2010/11): | 2,225 PCO sites (Tele-access 40.9%) |
| Phase III | (upto year 2020/21): | 5,116 PCO sites (Tele-access 86.4%) |

## **9.6 Mobile Telephone Network**

A remarkable expansion of mobile communications is scheduled in order to encourage the hidden demands. The expansion of the network capacity is scheduled to be 400,000 by year 2005/06, 510,000 by year 2010/11 and 690,000 by year 2020/21, respectively.

The prepaid card for mobile-phones shall be introduced to save the time and management efforts.

Considering the rapid and huge expansion of the mobile-phone network, the interface points to the fixed-phone network shall be introduced in each PC and Tandem in the early stage.

## **9.7 Public Data Network**

“Ethio Stream” as the public data network was established in year 2001 with 10 nodal sites covering Addis Ababa and 9 major cities.

Currently the number of internet subscribers as well as the users of the leased digital stream is very small, but M/P assumes the rapid increase of IT users considering the world trend towards info-communications era. M/P assumes the demands as well as the facility expansion of 109,000 in year 2005, of 191,500 in year 2010 and of 405,200 in year 2020, considering demands from mobile-phone (30%), e-Government, e-education, e-medical and so on.

In this regards, the internet nodes are scheduled to be introduced to the following cities;

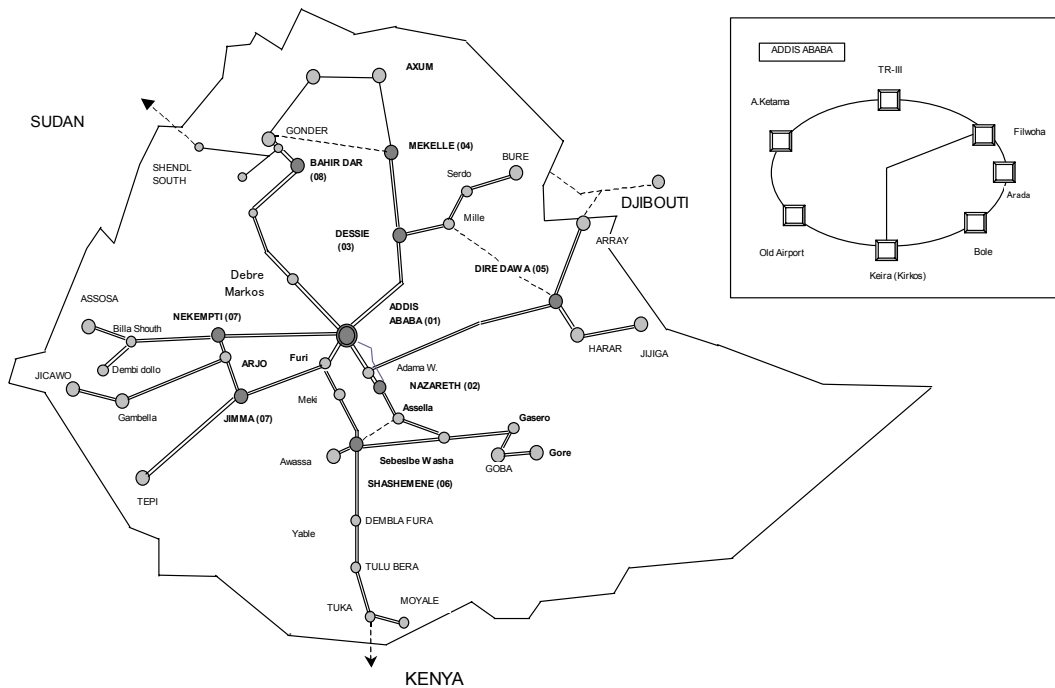
**Table 9-1 Candidate Locations of POPs**

| Year      | Candidate Locations  |
|-----------|--|
| 2005      | Yeka, D.Brahan, Akaki, Gerji, Kotobe   |
| 2006-2015 | Kolfe, Assela, Harar, Goba, Wolaita, Dilla, A.Minch, Muttu, D.Markos, Gonder |
| 2015-2020 | Hagere, Hiwot, Combolcha, Axum, Butajira, Assola                             |

**9.8 Transmission Network**

Required number of circuit is calculated based on the demand and traffic forecast in 2005/06, 2010/11 and 2020/21, respectively. Detailed expansion plans are provided for the national backbone links, domestic satellite links of VSAT, junction links at Addis Ababa, spur links over the country, rural links for PCO and International links via both Intelsat and terrestrial microwave routes.

O/F junction rings (double rings) with STM-16 is to be established within the short term plan. The congestion at Mt. Furi repeater station is also to be solved within the short term plan by installing O/F cable between TR-III and Nazareth.



**Fig. 9-1 Outline of Backbone Network (incl. On-going Project)**

### **9.9 Subscriber Access Network**

The first priority of the expansion of the subscriber network shall be given to such areas that have the idle capacities the switching system (around 260,000 l.u.) The priority shall also given to the rehabilitation of the malfunctioning or obsolete facilities such as;

- 1) Paper insulated lead sheathed cables
- 2) Poorly installed service wires (drop wire and internal wire)
- 3) Faulty DPs

The design standard as well as the installation standard shall be up-dated.

In order to satisfy the huge volulme of the expansion/rehabilitation works as well as the new subscriber connection works, M/P strongly recommends the use of the local/ foreign contractors.

It describes about criteria and pre-conditions for selection of network such as copper loop, fiber to zone and wireless loop. The application guidelines are also given for basic design, priority selection of cable types, provision period and provision cycle.

### **9.10 Supporting Facility**

M/P gives some suggestions for monitoring a status of present power supply capacity for future planning and design. For rural areas, where no commercial power is available, several power supply systems are discussed with merits and demerits.

For station building, M/P suggests to alter present design criteria and standardization of building types.

### **9.11 Information Communication Technology**

Diffusion of Internet users is not high in the regional areas. It is supposed to be low numbers of the computer owners and high tariffs for Internet connection.

Note: The tariff has been deducted by 80% in August, 2002.

However, depending on the Government policy for ICT and the worldwide trend of rapid growth of ICT services, M/P intends to enhance the growth of ICT services, giving the suggestion of the popular applications, such as Tele-medicine, distant learning, e-Government, etc. as well as the measures of the advertizement of ICT such as Cyber Café, ICT park and computer training, etc.

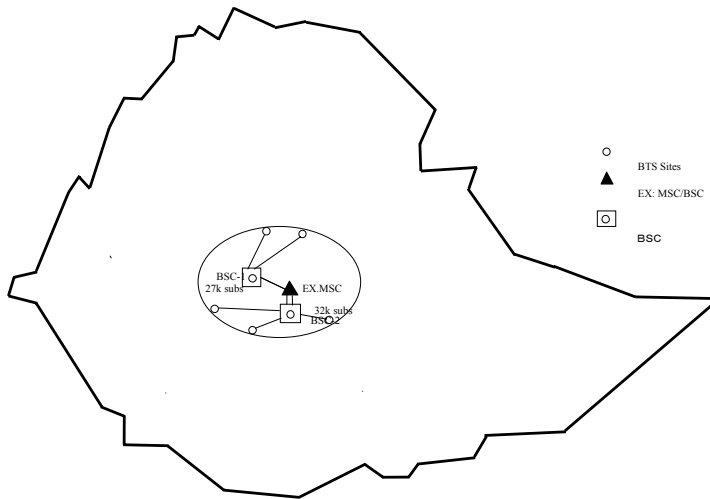


FIG. 9-2 Existing Mobile Link for Addis Ababa City

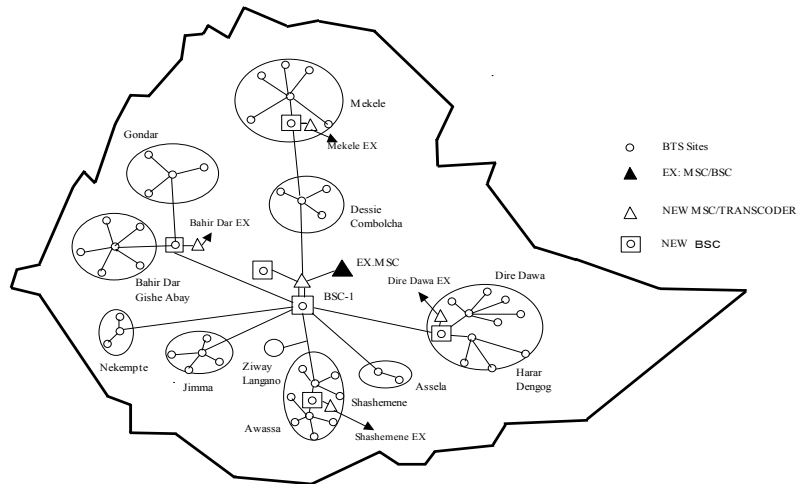


FIG.9-3 Service Coverage Plan for 12 Major Cities at Phase 2 Stage, (Reference)

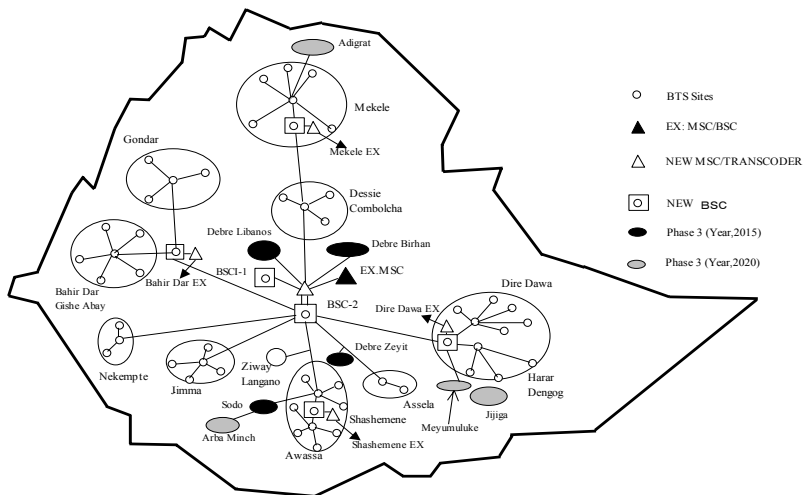


FIG. 9-4, Service Coverage Plan for Phase 3 stage, (Reference)

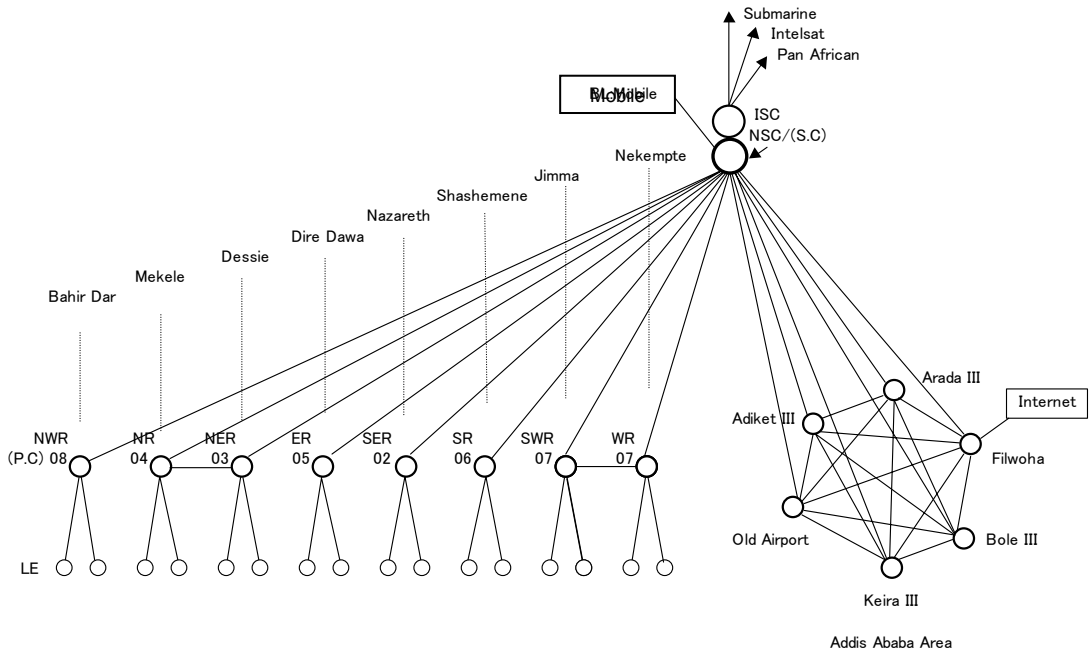


Fig. 9-5 Present Routing for PSTN

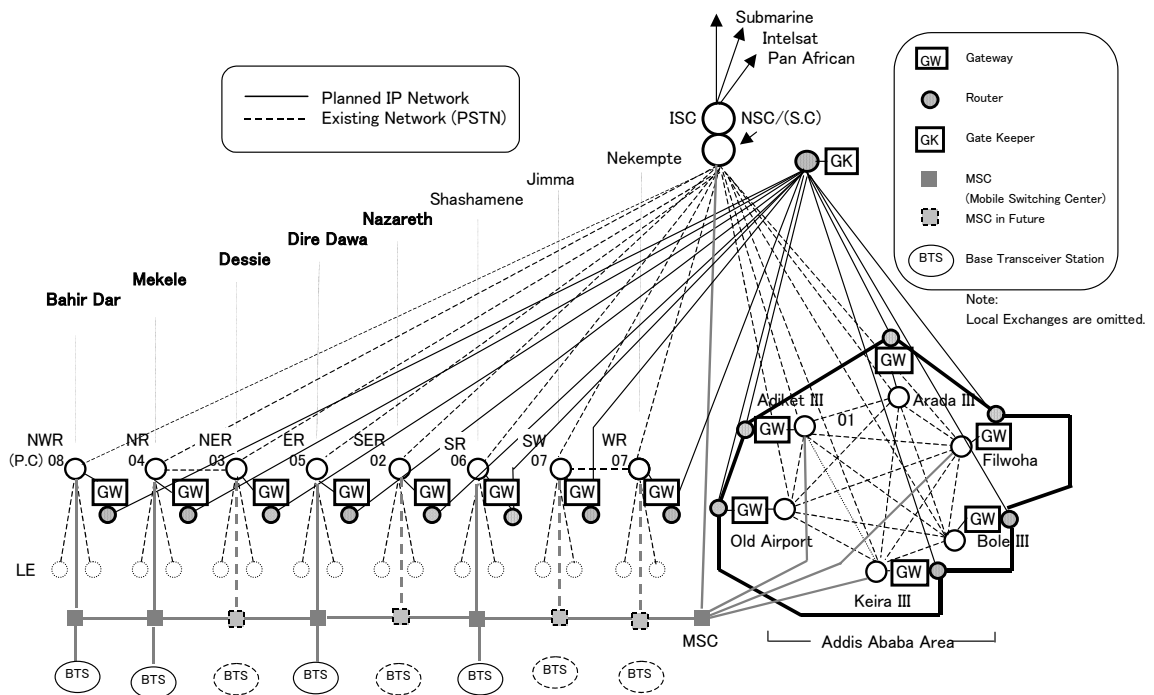


Fig. 9-6 Routing Plan for IP Network (2005)

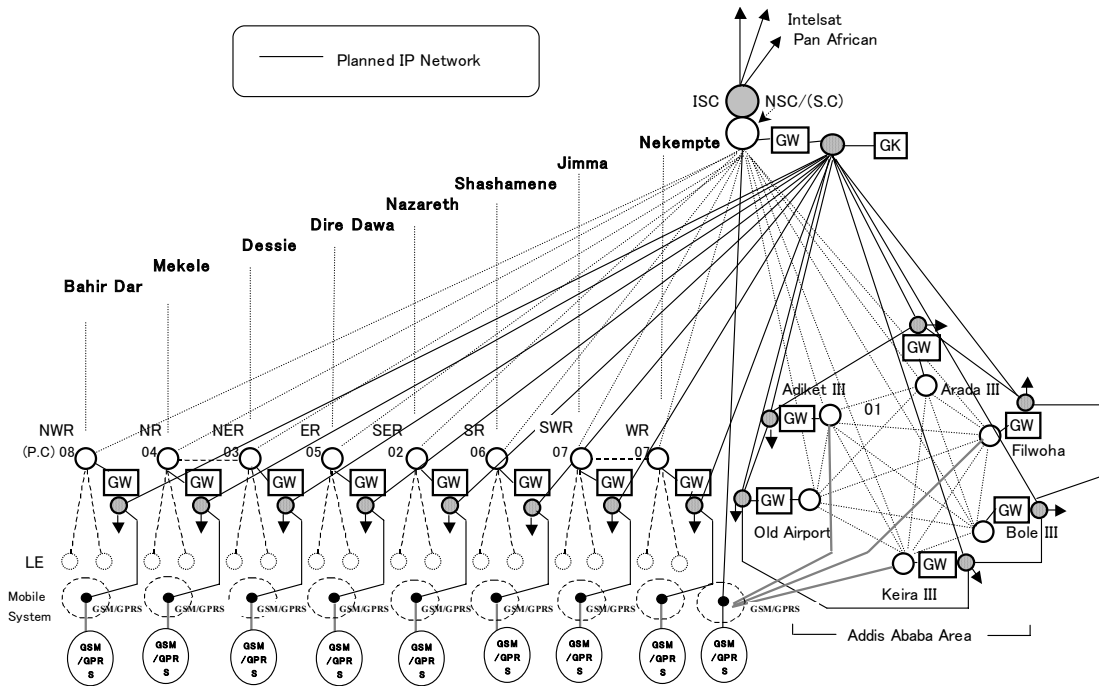


Fig. 9-7 Routing Plan for IP Network (2010-20)

COMMUNICATION NETWORK IN 21st CENTURY

NEXT GENERATION NETWORK UNDER DEVELOPMENT

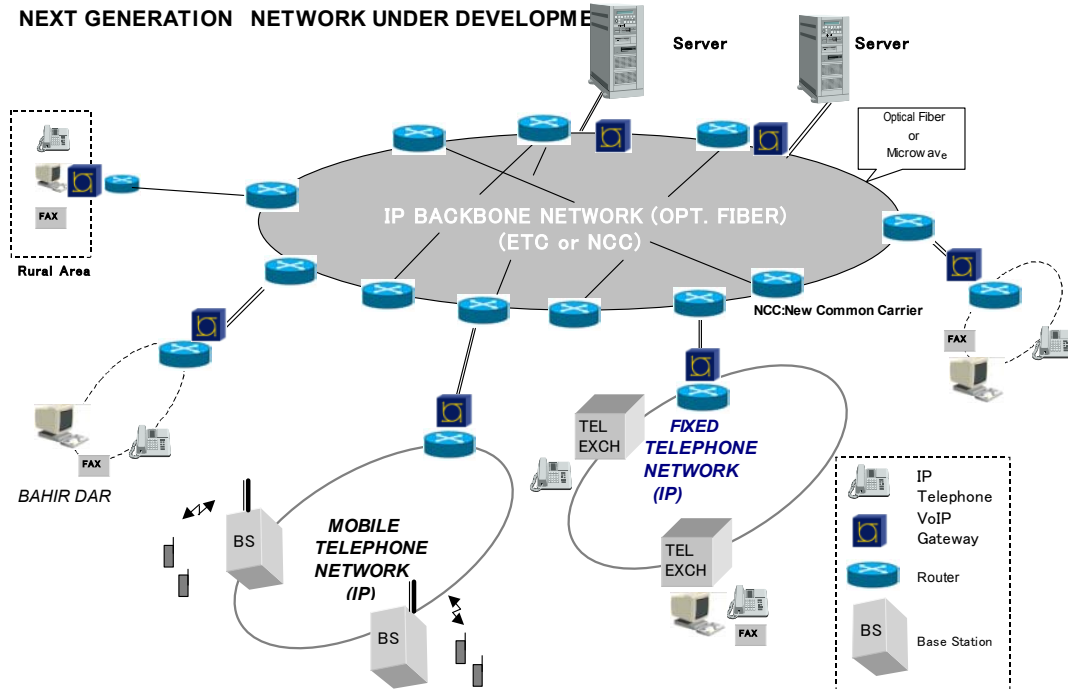


Fig. 9-8 Expectation to IP Network

## **CHAPTER 10 OPERATION AND MAINTENANCE IMPROVEMENT PLAN**

### **10.1 Urgent Plan**

#### **(1) General**

In order to implement the O/M functions of [1] keeping the performance and function of the telecommunications network and [2] connecting the utmost subscribers using the available network facilities, following urgent actions have to be taken:

- 1) Establishment of the standard uniformed procedure of the reporting of site situation and thus enable the quick decision on the ad-hoc action plans
- 2) Placing the QoS target followed by the cost effective action plans
- 3) Classification of the maintenance steps in order to maximize the maintenance efficiency
  - Controlled maintenance
  - Preventive maintenance
  - Corrective maintenance

#### **(2) Reinforcement of the New Connection Capability**

- 1) Strengthen the administrative capability for the new connection by the aid of computer network
- 2) New connection task force by out-sourcing

#### **(3) Standardization of Maintenance Flow**

Standardization of the maintenance flow through the comprehensive/uniformed report of the site situation in such way that the management can analyze the problems and make the quick action plans for the solution. The standard maintenance flow and the uniformed site report shall be integrated into CIMIS.

#### **(4) Safety Measures**

Safety management is one of the important policy, and the safety measures of every level shall be clearly established and maintained.

### **10.2 Preventive Maintenance**

Replacement of the service wires (drop wire and internal wire) is recommended considering the 70% faults coming from the non-standard service wires. The rehabilitation of the service wire shall be very effective to decrease the fault rate.

In this concern, the field trial of the rehabilitation project of the service wire is recommended.

### **10.3 Decentralization of the O/M Function**

The responsibility of the site O/M function is to be delegated to region/zone level, and HQ is to take care of the coordination, relations with other authorities and budget acquisition.



The part of the site O/M responsibility is to be further delegated to maintenance area offices (TSC).

#### **10.4 Culture Change through Management by Objective**

In order to improve the sector productivity as well as to satisfy the customer, cultivation of the individual capability is essential.

Each individual shall understand the business objective and the corporate target of the productivity and quality of service (QoS). The management shall delegate the authority to each individual depending on his position motivating his effort to achieve the self-setting target relating to the corporate target.

Targets for the QoS as well as the productivity are recommended.

#### **10.5 Introduction of OPMC (Outside Plant Maintenance and Training Center)**

Considering the high fault rate and rapid increase of the local access copper loops, OPMC is scheduled to be established in Addis Ababa and 9 major regional towns.

Two OPMCs in Addis Ababa are to be established by year 2005 and other 9 by year 2007.

#### **10.6 Customer Service**

##### **(1) Bill Production and Collection**

Bill production shall be completed within 15 days. For the purpose, the bill production system for analog exchange is preferably improved applying OCR processing.

Concerning the bill collection, the banking system can be used for official/corporate customers. The bill collection offices with longer duty time (7:00~21:00) are to be established for the customers' convenience.

The Pre-paid (SIM card) system is to be introduced for the mobile-phone shortly.

##### **(2) Improvement of the Applicant Interface Environment and Waiting Applicants Management**

With the help of CIMIS,

- Updated facility information shall be available at customer service offices.
- Waiting applicants shall be filed with easy/simple indexes.

##### **(3) New Services**

- Provision of the detailed bill upon customer's request
- STM-1 ring network for key customers
- Pre-paid type mobile-phone

**CHAPTER 11 ORGANIZATION AND HUMAN RESOURCE DEVELOPMENT PLAN**

**11.1 The Regulator (ETA)**

Proposed programs or actions for strengthening ETA is as follows.

For the regulator, immediate organization strengthening is recommended with staff increase and enhancement of information collection capability.

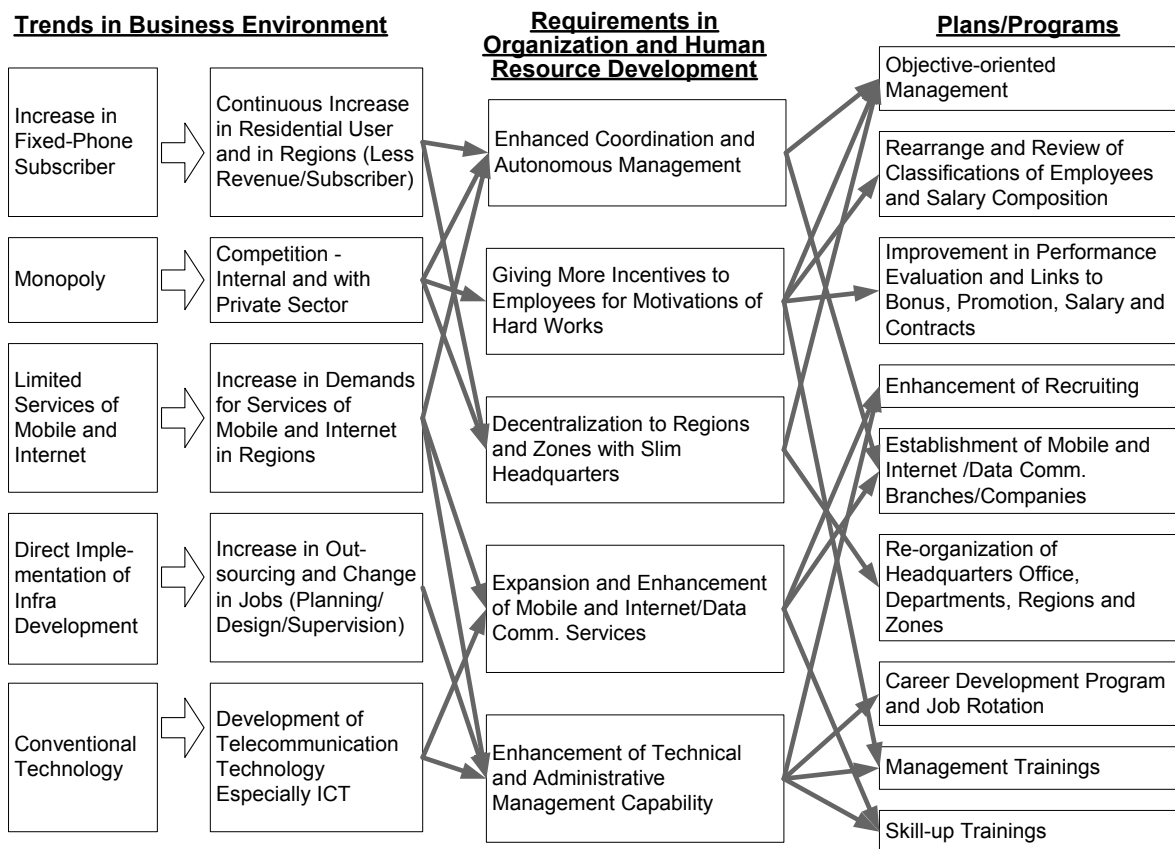
With the strengthened organization, it is necessary for ETA to promote participation of the private sector for more efficient services of the sector. To promote the participation, ETA should prepare and formulate various types of criteria, standards, guidelines as well as certification and authorization schemes, as recommended below and in the main report. Even in the monopolized situation in short term, private participation to non-core service, outsourcing for ETC, will encourage the efficiency, as ETA has fairly stated the promotion recently.

**Table 11.1-1 Program/Action Proposed in Organization and Human Resource Development Plan for the Regulator**

| Program/Action   | Short Term   | Middle-Term and Long Term  |
|--|--|--|
| 1. Organization Strengthening/<br>Human Resource Development   | <ul style="list-style-type: none"> <li>* Increase of Staff (already planned)</li> <li>* Participate to International and Foreign Training</li> <li>* Establish a Library/ Internet Environment</li> </ul>  | <ul style="list-style-type: none"> <li>* Information Exchange with International Organizations and Foreign Regulators</li> </ul>   |
| 2. Strengthening Regulatory Functions for Promotion of Tele-communication Industries and Customer Protection | <ul style="list-style-type: none"> <li>a. Carrying out Basic Regulatory Functions (Financial and Management Auditing, Technical Inspection)</li> <li>b. Establishment of Policy for Universal Access and Formulation of Rural Tele-Communication Development Plan</li> <li>c. Drafting Regulations/Standards/Guidelines and Authorization/Certification System for Promotion of Private Participation to Telecommunication</li> <li>d. Collaboration with Universities/Colleges/Vocational Training Schools to Establish or Expand Courses on Telecommunication</li> <li>e. Defining Standards and Guidelines for Interconnection (including tariff control).</li> </ul> | <ul style="list-style-type: none"> <li>* Enhancement of Regulations for Effective and Efficient Tariff Control, Universal Access, and Promotion of Private Participation and Investment in Operation (continuous upgrade of a. to e. of the left in changing environment)</li> <li>f. Development of Tribunal Functions</li> </ul> |

## 11.2 The Operator

In order for ETC to work as a corporation with commercial objectives, not as a government authority to grant public services, its corporate culture has to be changed. The ultimate aim of the following plans and programs is to change the culture of ETC, where every one of employees is willing to work for the benefits of themselves, recognizing that their benefits come from the profits of ETC, and profits are gained only when ETC provides good service efficiently. In order to correspond to the changes in the market and business environment, following plans and programs were designed as shown the figure and the below.



Improvement in objective oriented management would help to avoid disorganized implementation of projects and operation and maintenance works. Substantial coordinating efforts will be required, especially at planning and monitoring phase, among departments and divisions.

As for human resource development, more attentions have to be placed on-the-job training (OJT) by introducing career development program and job rotation. For the Off-JT, management training, consisting those for organization and project management, are necessary to be enhanced. For skill up training, further efforts is required for training of information technology specialists and to up-grade to higher level of technicians or to assistant engineer.

**Table 11.2-1 Organization and Human Resource Development Plan of the Operator**

| Plan/Program                     | Short Term   | Middle-Term   | Long Term |
|----------------------------------|--|---|-----------|
| 1. Objective Oriented Management | * Introduction to Department, Region and Zone Level                        | * Spread to Division, Section/ Unit and Team Level and Enhancement  |           |
| 2. Personnel Management          | a. Enhancement of Recruiting   |   |           |
|                                  | b. Rearrange Classification of Employees and Salary Composition            | b. Continuous Review the Classification   |           |
|                                  | c. Improvements in Performance Evaluation and Links to Bonus and Promotion | c. Links of Performance Evaluation to Objective-Oriented Management and to Salary or Employment Contracts |           |
| 3. Organization Strengthening    | a. Establishment of Mobile and Internet/Data Com. Branches                 | a. Establishment of Mobile and Internet/Data Com. Companies and Competition with Private Operators        |           |
|                                  | b. Re-organization of Corporate Planning and Business Development Dept.    |   |           |
|                                  | c. Re-organization of Telecom Infrastructure Development Dept.             |   | ---       |
|                                  | d. Re-organization of Telecom Services Dept.                               |   |           |
|                                  | e. Re-organization of Regions and Zones                                    |   |           |
| 4. Human Resource Development    | a. Career Development Program and Job Rotation                             |   |           |
|                                  | b. Management Trainings (Organization and Project Management)              |   |           |
|                                  | c. Continuous Upgrade of Skill-up Trainings, especially for ICT            |   |           |