Supporting Document 13.2

Breakdown of Capital Investment

Project cost is estimated based on the following conditions and assumptions.

(1) Fixed Phone

- Copper loop access network is based on per line cost including material and installation for both primary and secondary cables.
- WLL and FTZ access network is also based on per line cost which includes costs of necessary facilities, such as antenna supporting structure for WLL and power supply facility required for both.
- Digital switching unit is based on per line cost without discriminating new/replacement or expansion of the system, in which cost for power supply facility is included.
- Installation of 2nd international gateway exchange and sub-master clock in Nazareth is planned in the 1st phase of the middle term. The cost is estimated based on the digital switch as circuit switched connection services will remain for several years in the international circuits.
- Cost for replacement of master clock is estimated in both middle and long terms.
- Terminal equipment, such as telephone set, facsimile terminal are not included in the project cost, which are to be purchased by each subscriber.

(2) Mobile Phone

- The cost include necessary facilities and installation cost, such as radio links connecting base station to cell stations, power supply facilities, MSC, base stations, cell stations equipment, and SIM cards for subscriber terminals. However, mobile terminal cost is not included in the project cost, which is to be purchased by subscribers.
- Project cost was estimated referring to the information/data contained in the Business Plan for Ethio-Mobile Service.

(3) Junction Network

- Construction of new duct system including man-holes is included in the cost estimate.
- Material cost, optical fiber cable with 24 cores (40 km long), STM-16 terminal equipment and NMS (Network Management System) and installation cost are included in the cost estimate.
- Digital Cross Connection function is provided for 2 stations, Filwoha and Keira (Kirkos) where two rings are interconnected. And provision of Add/Drop function is considered for all 13 nodes located on the ring.

(4) IP based Network

- VoIP/IP network facility price is decreasing by about 10 % annually. However, 60 % level of the initial price is applied for the middle and long term cost estimate.
- Cost of IP trunk network to be established initially connecting each primary center, MSC and tandem exchanges of A.A is based on the network configuration shown in Figure 13.1-2. In particular, soft switch and edge routers to be installed in A.A IP network are to have enough capacity to carry a half of the traffic loaded on trunk circuit in 2005, to avoid frequent additional installation. Cost for additional soft switches and edge routers are estimated in the long term period.

(5) Rural Communications Network

- Two systems are mainly applied for construction of rural communications network, terrestrial radio (DRCS) system and satellite communication system (VSAT). In case of terrestrial system, expansion of radio link from the nearest existing radio repeater is considered to establish the network economically. And in case of satellite system, "FaraAway" system is applied considering provision of subscriber connections to farmer's association office and other governmental agencies besides the PCO use and also avoiding double hop circuit connections which causes time delay that results the drop of QoS.
- Solar power supply system is introduced for all new PCO sites as commercial power supply will not be available.
- New building construction is considered for all PCOs. Such cost is included in the cost estimated for rural telecommunications network development.

(6) Transmission Network

- In addition to the construction of transmission system planned under the 8th telecommunications development plan, construction of huge number of radio links is required for trunk and spur routes, as shown bellow:

  STM 1: 31 links, PDH : 327 links, Radio repeaters: 614, new tower: 31 for SDH links and 941 for PDH links, Power supply system : 31 sites (commercial power) and 470 sites (solar).
- Construction of 31 STM 1 links and about 100 PDH links will be implemented in the short term. However, the about 200 PDH links planned in the short term will be implemented in the short term and middle term so as not to cause financial difficulties..

(7) Building and power supply facilities

a) Building:

- For PCO to be opened newly, new building is to be constructed, in case an appropriate building, such as farmers association office, town administrative office, etc. is not available for establishing PCO in the area. Assumption is made that new building is required for all new PCOs in the cost estimate.
- For exchange to be newly opened, assumption is made that new building is required for all exchanges. The cost for such exchange is estimated based on the standardized small building by ETC. Cost estimate was made based on 170 buildings in middle term and 150 in long term, respectively.

b) Power supply facilities:

- For cost estimate, solar power supply system is to be provided for all new PCOs.
- Assumption is made that no commercial power supply is available at all places where new PCOs are to be established, hence cost required for solar power supply system is included for new PCOs.
- For the existing radio stations where expansion of system is implemented, existing power supply system is available for new equipment.

(8) CIMIS

- The cost in the short term is based on the budget allocated for introduction of CIMIS by ETC, in which not only cost of hardware but for capacity building, i.e., software and training are included.
- Considering the replacement/addition of hardware as well as upgrading the system, approx. 8.5 Mil. USD and 17.0 Mil USD are estimated for middle and long terms, respectively.

(9) Technical Support by Civil Work Specialist

- On specialist cost is included in the project cost, who helps in standardizing exchange buildings, various type of man-holes, etc..

(10) Spectrum Management System

- Cost includes for establishing fixed monitoring station (HF/VHF/UHF) in Addis Ababa and for 3 sets of mobile monitoring stations.