

## Ghana

### Telecommunication Expansion Project (II)

Report Date: October, 2002

Field Survey: July, 2001

#### 1. Project Profile and Japan's ODA Loan



Project Site



Switchboard System (Accra Station)

#### 1.1 Background

In 1985, Ghana had only 0.29 telephone lines for every 100 inhabitants, lower than the African average of 0.4. After the economic crisis of the 1970s, the operation and maintenance of Ghana's telecommunication services had deteriorated. In addition, rapid technological advancement in the telecommunication sector in the world made the existing technology in Ghana obsolete; consequently, it became difficult to obtain spare parts in the market. In 1985, roughly 20% of 55,000 DEL<sup>1</sup> (communication capacity) was operated manually, and 60% of the remainder went through an outdated and obsolete "step-by-step" switchboard system. And deterioration of urban telecom cables was severe, causing various disruptions. In fact, it was estimated that, in light of the deteriorated condition of the lines, the actual figure of telephone density in Ghana was 0.2 per 100 inhabitants.

On the other hand, the demand for telephones far exceeded supply; in 1985, 80% of applicants were on the waiting list, and as the country was on the track of economic recovery and growth, this demand was expected to grow by 7% per year in the 10 years.

In order to cope with the above situation, international donors assisted Ghana's telecommunications development. For example, the World Bank extended funding for Telecommunication Projects (I), which was co-financed by ODA loans from Japan in 1985. This project, Telecommunication Expansion Project (II), was an integral part of the Second Telecommunications Project coordinated by the World Bank and co-financed by France and the

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<sup>1</sup> Direct Exchange Line System

Netherlands.

## 1.2 Objectives

To improve telecommunication services by establishing and rehabilitating the telecommunication network, and to achieve a partial fulfillment of unsatisfied telephone demand in Ghana (Accra, Cape Coast, Kumasi, and other areas).

## 1.3 Project Scope

The project consists of: (1) establishing and replacing telephone switching systems (39 stations: 40,100 lines) and constructing one regional office, (2) establishing local transmission systems with digital microwave (11 sections), (3) establishing and rehabilitating long distance transmission system with microwave (13 sections) and UHF transmission links (15 sections), (4) rehabilitating 2 radio stations, (5) establishing and rehabilitating 13 local cable stations, and (6) providing consulting services. Local transmission systems serve the Accra North, Central, Kumasi and Takoradi areas, while the long-distance systems serve across the entire country (i.e., South, Central and North regions).

## 1.4 Borrower / Executing Agency

The Government of the Republic of Ghana / Ghana Telecommunications Company Ltd. (former Posts and Telecommunications Corporation)

## 1.5 Outline of Loan Agreement

<b>Loan Amount / Loan Disbursed Amount</b>	10,508 million yen / 10,384 million yen
<b>Exchange of Notes / Loan Agreement</b>	September, 1988 / December, 1988
<b>Terms and Conditions</b>	
<b>Interest Rate</b>	2.5 % p.a.
<b>Repayment Period (Grace Period)</b>	30 years (10 years)
<b>Procurement</b>	Partially Untied
<b>Final Disbursement Date</b>	September, 1996

## **2. Results and Evaluation**

### **2.1 Relevance**

The project's objective was consistent with the Government's policy and its priorities at the time of appraisal. Under the Second Economic Recovery Program (1986-88) of the Ghanaian Government, the transportation and telecommunications sectors were given priority for the public investment, as the absence of an efficient telecommunications service had long been identified as one of the major constraints on economic and social development. The Project also constituted an integral part of the Second Telecommunications Project, which was coordinated by the other international donors.

At the time of appraisal, privatization of the telecommunication sector was not a common practice in Sub-Sahara African countries. The situation changed in the mid-1990s, when structural adjustment programs reviewed the state-owned enterprises. In an effort to achieve rapid expansion and to improve the quality of service through increased private-sector participation, Posts and Telecommunications Corporation was privatized in 1997 as Ghana Telecommunications Ltd.. Ghana Telecommunication has earned a reputation for improving service quality<sup>2</sup>, and it can be said that the relevance of the Project still remains even after the privatization of Ghana Telecommunications.

### **2.2 Efficiency**

#### **2.2.1 Project Scope**

All project components were implemented as planned, although switch capacity was increased in some cases, partly with Ghana Telecommunications' own funding. These revisions were made by the difference in the demand for telecommunication services between the time of initial survey and of implementation.

The executing agency reported that the performance of the consultant and contractors was reported satisfactory overall, especially in terms of staff qualifications, expertise, schedule adherence, and quality controls.

#### **2.2.2 Implementation Schedule**

The project was completed in 1996, with delays totaling three years, which was mainly attributed to the long, complex approval system on the procurement within the Ghanaian government before privatization. This caused delays in the procurement of equipment and in recruiting consultants.

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<sup>2</sup> See, for example, World Bank (1998), *World Development Report – Knowledge for Development*. (p. 68, Box 4.7 “Competition before privatization in Ghana's telecommunications services.”)

### 2.2.3 Project Cost

The total actual cost was almost same as originally planned: 10,441 million yen as compared to 10,508 million yen at the time of appraisal. There was a slight increase in the foreign currency portion, from 9,430 million yen to 10,075 million yen, due to the increase in project scope. The local currency has depreciated sharply since the appraisal, causing a nominal increase of the local portion of the project from the original 1,389 million cedis to an actual 40,613 million cedis. However, when the local currency expenditure is evaluated in terms of Japanese yen, it is decreased to 366 million yen from 1,078 million yen.

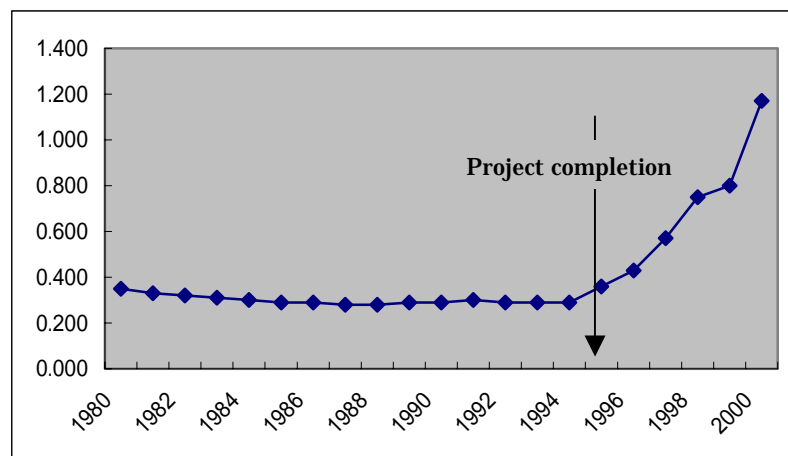
## 2.3 Effectiveness

### 2.3.1. Improvement of Telephone Access

Between 1994 and 1996, the Project delivered 53,750 DEL, out of which 11,300 were replaced for obsolete switching facilities, resulting in a net increase of 42,450 in DEL capacity. Together with other sources, at end of 1996 when the Project was completed, Ghana had attained a DEL capacity of 103,726, rising the number of telephone lines per 100 inhabitants from 0.290 in 1985 to 0.430 in 1996. (Figure 1) Since only aggregated figures for the whole country are available, it is impossible to evaluate project achievement regionally. However, as the Project covers almost the entire telecommunication network in the country, it is safe to assume that this improved telephone access was partly attributable to the Project.

Since 1996, there has been a further improvement in telephone access for the Ghanaian population. The number of telephone lines per 100 inhabitants became 1.170 in 2000. Deregulation and privatization implemented in 1997 may have contributed to enhancing the efficiency of the sector and to facilitating a flow of private investment to the sector, resulting in further improvement in telephone access.

Figure 1: Telephone lines per 100 inhabitants in Ghana



Source: ITU Statistical Yearbook

### 2.3.2. Improved Quality of Service

Table 1 shows telephone access and service quality indicators in Ghana before and after the Project. The completion rates for both domestic and international calls improved significantly. For example, from 21% for international incoming calls in 1992 to 50% in 1998, and from 49% for domestic long-distance calls in 1990 to 83.3% in 1998. On the other hand, the increase in the number of telephone lines did not keep pace with the increasing telephone demand, so the telephone line waiting list continued to grow.

Table 1: Telephone access and service quality indicators in Ghana  
(before and after the Project)

	1990	1995	1996	1998	2000
Public pay phones in Ghana	n.a.	30	453	1,815	3,180
Telephone lines in operation	44,243	63,067	77,886	144,218	237,178
Telephone lines per 100 inhabitants	0.290	0.360	0.430	0.750	1.170
% of automatic main lines	96	100	100	100	100
% of digital microwave** main lines	n.a.	90	91	95	100
% of residential main lines	40	n.a.	42	42	42
Connection capacity of local exchanges	60,025	106,249	112,899	161,886	288,646
International telephone circuits	238	541	822	1,019	n.a.
Waiting list for main lines	11,900	28,349	66,638	109,037	113,065
Completion Rate					
International (%)	21/47*	20.4/47.6	30.5/64.5	50/60	n.a.
Long distance (%)	49	57	68.9	83.3	n.a.
Local (%)	58	75	75.5	83.2	n.a.
Telephone Traffic					
International (in)	4,772	16,758	20,767	28,900	43,820
International (out)	16,178	35,000	64,000	100,800	166,361
(in thousand minutes)					
Long distance	n.a.	n.a.	n.a.	n.a.	n.a.
Local	n.a.	n.a.	n.a.	n.a.	n.a.

Source: GT and ITU Statistical Yearbook

Note: (\*) 1992 figures – international completion rates report both incoming (left)/outgoing (right); (\*\*) digital microwave is technically different from ISDN network, although the ISDN network is rapidly expanding in Ghana

### 2.3.3. Financial Internal Rate of Return (FIRR)

The project brought Ghana Telecommunication additional revenue. The re-calculated FIRR was 12.3%, slightly lower than the 13.2% calculated at the time of appraisal. The following assumptions have been applied in re-calculating FIRR:

Costs: Investment costs of the Project and incremental operation and maintenance costs for the project facilities (all expressed in 1995 constant prices).

Benefits: Incremental revenues produced from the Project (in 1995 price setting), and it is

assumed that the Project attained its full capacity level in 1997.

Project life: 20 years

## **2.4 Impact**

### **2.4.1 Improved Access to Information**

Improved access to information, facilitated by expansion of the telephone system, brought about both tangible and intangible socio-economic benefits to the country. The executing agency reported at this evaluation that, in particular, the expansion of telecommunication networks among and between producers, retailers, exporters and consumers reduced transportation costs in timber and agricultural industries, and that many lives have been saved, reportedly, because villages now have access to telephones to call doctors. More recently, modernized transmission systems have facilitated an expansion of email and internet services in the country. According to ITU's estimation, the number of internet users in Ghana increased more than 15 times between 1995 and 1996, when the Project was completed.

### **2.4.2 Environmental Impacts**

According to Ghana Telecommunication, no negative environment impact has been reported for the Project. There was no involuntary relocation or resettlement of local residents.

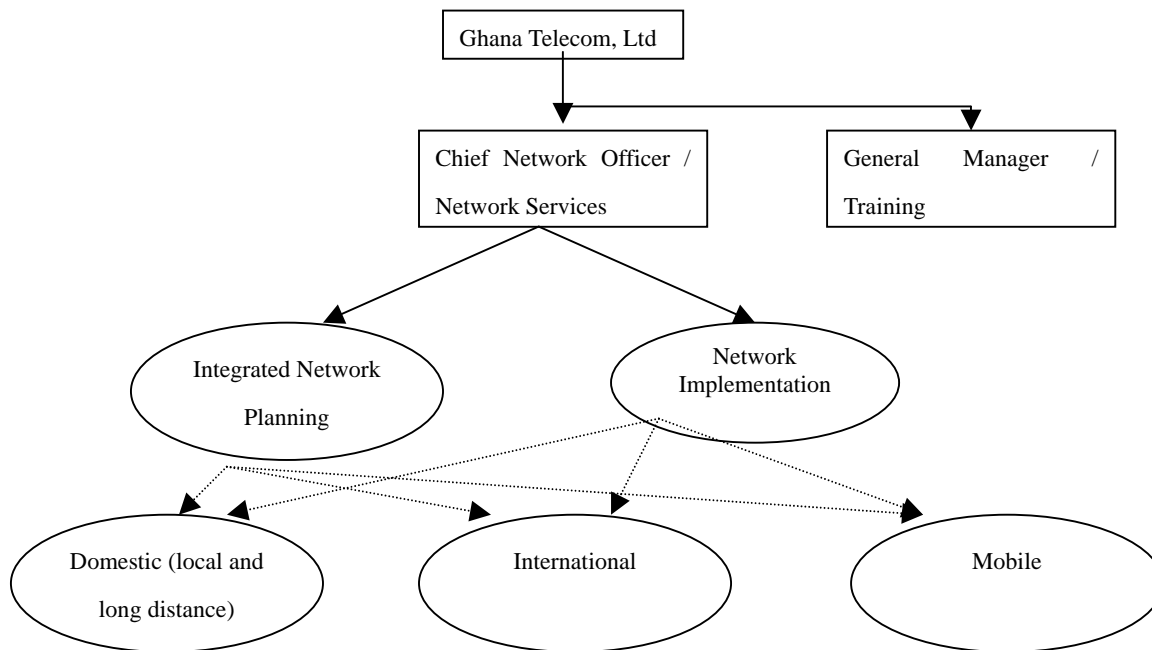
## **2.5 Sustainability**

### **2.5.1. Organizational Structure**

Ghana Telecommunication Ltd. is the leading provider of telecommunications services in the country. It was privatized on February 20, 1997, through the sale of 30% of its shares to G-Com Ltd. There are two shareholders: the Government of Ghana, with 70%, and G-Com Ltd., which is a consortium led by Telekom Malaysia.

### **2.5.2. Operation and Maintenance**

Ghana Telecommunication has branches in all 10 regional capitals and in most of the 110 district capitals in the country and employs 3,521 people; the number of telephone lines per employee is 44.06 lines (January 31, 1999). Day-to-day administration of the company is conducted by a Management Committee, which is headed by the Managing Director. Ghana Telecommunication has a 7-member board; 3 are representatives appointed by the Government of Ghana (including the board Chairman) and the other 4 represent G-Com Ltd.



**Figure 2: O&M Organization Chart**

According to Ghana Telecommunication, privatization enhanced the efficiency of their operation and maintenance of the project by emphasizing cost-effectiveness and bringing about a clearer division of the functional responsibilities shared by all O&M staff. The Chief Network Officer at Network Services is directly responsible for the operation and maintenance of facilities and transmission services. The Network Services Section is sub-divided into an Integrated Network Planning and an Network Implementation unit. The training division provides training to help staff keep up-to-date with advancements in telecommunications technology. There are also company-awarded scholarships, given to 62 students to pursue higher education in Ghana, and 6 students have been sent to Malaysia for engineering courses.

### **2.5.3. Present Condition of Project Facilities**

According to Ghana Telecommunication officials, all facilities and equipment established under the Project, including the switchboard and transmission systems, are appropriately maintained.

### **2.5.4. Financial Statements**

In 2000, the revenue of Ghana Telecommunication increased by almost 50% over the previous year, although there was an increase in operational expenses arising from the installation of ISDN networks, which led to a drop in net profit in the short run. Accordingly, the Return On Assets (ROA) was 14.92% for 1999 and 7.01% for 2000. However, the increase

in the number of ISDN networks is expected to increase the number of ISDN subscribers in the near future, and hence the ROA is expected to recover.

One of the constraints for Ghana Telecommunication is control over the tariff structure, which is still regulated by the government. Thus, although Ghana Telecommunication has made several proposals, it has not been able to implement a single tariff increase since 1996.



### Comparison of Original and Actual Scope

Items	Original	Actual
<b>1. Project Scope</b>		
<b>(1) <u>Switching System</u></b>		
Switchboard	39 stations: 40,100 lines	As planned: 53,750 lines of which 18 stations: 52,000 lines (Urban) 21 stations: 1,750 lines (Rural)
Regional Office	* Including replacement of 2,500 lines 1 building (Cape Coast) 6 offices	* Including replacement of 11,300 lines 1 regional office building, 5 telephone exchange buildings and 1 building extension
<b>(2) <u>Local Transmission System</u></b>		
Digital Microwave	140 Mb/s 3 hops 43 Mb/s 8 hops	140 Mb/s 6 hops 34 Mb/s 4 hops
<b>(3) <u>Long Distance Transmission System</u></b>		
Microwave	140 MB/S 13 hops	140 MB/S 19 hops
UHF	17 MB/S 11 hops 8 MB/S 4 hops	34 MB/S 9 hops 8 MB/S 10 hops
Sub Base Bank	12 stations 2 ch for each	7 stations 2 ch each
Digital MAS (Kumasi)	300 channel,	As planned
VFT	1 master station	As planned
Power Source Improvement	12 stations 15 solar hybrid system	As planned
<b>(4) <u>Coast Radio Station (rehabilitation)</u></b>		
	2 stations (Takoradi, Tema)	1 station (Tema) + 8 VHF Transceiver stations along Coast of Ghana
<b>(5) <u>Local Cable</u></b>		
	13 stations Cable 22,800 pairs / 79,800 p-km	As planned 37,700 pairs
<b>(6) <u>Consulting Service</u></b>		
Survey, supervision; assistance for bidding, evaluation, D/D, supervision, testing and experiments	250 m/m	329 m/m

<b>2. Implementation Schedule</b> Selection of Consultant Prep. of Tender Documents Tender Evaluation Contract Negotiation Civil Work Manufacturing Shipment Installation Training O&M	July 1988-Jan 1989 Feb 1989-June 1989 July 1989-Sept 1989 Oct 1989-Dec 1989 Jan 1990-Feb 1990 Aug 1990-Sept 1991 March 1990-Dec 1990 May 1990-March 1991 Aug 1990-March 1992 Jan-March 1991, March 1992 April 1992-March 1993	Aug 1989 – Nov 1990 -Apr 1992 June 1992-Aug 1992 Sep 1992-Mar 1993 April 1993-July 1993 Sep 1994-Dec 1995 Jan 1994-Mar 1995 Apr 1994-June 1995 June 1994-Sept 1995 Mar 1994-June 1995 Apr 1994-Mar 1996
<b>3. Project Cost</b> Foreign currency Local currency  Total ODA loan portion Exchange Rate	9,430 million yen 1,078 million yen (1,389 million cedi) 10,508 million yen 10,508 million yen 1 cedi = 0.776 yen (Dec. 1987)	10,075 million yen 366 million yen (40,613 million cedi) 10,441 million yen 10,384 million yen 1 cedi = 0.009yen (Dec. 1995)