

**PROJECT PERFORMANCE AUDIT REPORT**

**ON THE**

**TELECOMMUNICATIONS PROJECT  
(Loan 1300-MON[SF])**

**IN**

**MONGOLIA**

**December 2003**

## CURRENCY EQUIVALENTS

Currency Unit		–	togrog (MNT)	
		<b>At Appraisal</b> (February 1994)	<b>At Completion</b> (April 2001)	<b>At Operations Evaluation</b> (August 2003)
MNT1.00	=	\$0.0024	\$0.0009	\$0.0009
\$1.00	=	MNT409	MNT1,093	MNT1,150
SDR1.00	=	\$1.4068	\$1.3845	\$1.3813

## ABBREVIATIONS

ADB	–	Asian Development Bank
CRC	–	Communications Regulatory Committee
EIRR	–	economic internal rate of return
FIRR	–	financial internal rate of return
KfW	–	Kreditanstalt für Wiederaufbau
MT	–	Mongolian Telecom
MTC	–	Mongolian Telecommunications Company
OEM	–	Operations Evaluation Mission
PCR	–	project completion report
PPAR	–	project performance audit report
PTA	–	Post and Telecommunications Authority
SDR	–	special drawing rights
TA	–	technical assistance
USOF	–	universal service obligation fund

## NOTES

- (i) The fiscal year (FY) of the Government ends on 31 December.
- (ii) In this report, "\$" refers to US dollars.

## CONTENTS

	Page
BASIC DATA	iii
EXECUTIVE SUMMARY	iv
MAP	ix
 I. BACKGROUND	 1
A. Rationale	1
B. Formulation	1
C. Purpose and Outputs	2
D. Cost, Financing, and Executing Arrangements	2
E. Completion and Self-Evaluation	3
F. Operations Evaluation	3
 II. PLANNING AND IMPLEMENTATION PERFORMANCE	 4
A. Formulation and Design	4
B. Achievement of Outputs	4
C. Cost and Scheduling	6
D. Procurement and Construction	7
E. Organization and Management	7
 III. ACHIEVEMENT OF PROJECT PURPOSE	 8
A. Operational Performance	8
B. Performance of the Operating Entity	12
C. Economic and Financial Reevaluation	13
D. Sustainability	14
 IV. ACHIEVEMENT OF OTHER DEVELOPMENT IMPACTS	 14
A. Socioeconomic Impact	14
B. Environmental Impact	15
C. Impact on Institutions and Policy	15
 V. OVERALL ASSESSMENT	 15
A. Relevance	15
B. Efficacy	16
C. Efficiency	16
D. Sustainability	16
E. Institutional Development and Other Impacts	16
F. Overall Project Rating	17
G. Assessment of ADB and Borrower Performance	17

	<b>Page</b>
VI. ISSUES, LESSONS, AND FOLLOW-UP ACTIONS	17
A. Key Issues for the Future	17
B. Lessons Identified	18
C. Follow-Up Actions	19
 APPENDIXES	
1. Major Physical Achievements	20
2. Project Cost	21
3. Actual Financing	22
4. Telephone Services, 1996–2003	23
5. Telephone Traffic, Mongolian Telecom, 1995–2002	24
6. Performance Indicators, Mongolian Telecom, 1997–2002	25
7. Financial Statements, Mongolian Telecom, 1995–2002	26
8. Staff Numbers, Mongolian Telecom, 1997–2003	28
9. Economic Reevaluation	29
10. Financial Reevaluation	36
11. Key Sector Issues	38

**BASIC DATA**  
**Loan 1300-MON(SF): Telecommunications Project**

**PROJECT PREPARATION/INSTITUTION BUILDING**

TA No.	TA Name	Type	Person-Months	Amount (\$)	Approval Date
1686	Telecommunications Development	PPTA	22	600,000	1 Apr 1992
2101	Telecommunications Sector Reform	ADTA	18	588,000	16 Jun 1994
2102	Accounting and Management Information Systems and Tariff Reform	ADTA	22	599,000	16 Jun 1994

**As Per ADB Loan**

KEY PROJECT DATA (\$ million)	Documents	Actual
Total Project Cost	48.60	49.08
Foreign Exchange Cost	36.47	41.00
ADB Loan Amount/Utilization	24.50	24.01 <sup>1</sup>
ADB Loan Amount/Cancellation		0.01
Amount of Cofinancing		
Nordic Group <sup>2</sup>	11.80	10.66
Kreditanstalt für Wiederaufbau	6.42	7.02

**KEY DATES**

	Expected	Actual
Fact-Finding Mission		20 Jul–6 Aug 1993
Appraisal Mission	Oct 1993	1–19 Feb 1994
Loan Negotiations	May 1994	16–18 May 1994
Board Approval	Jun 1994	16 Jun 1994
Loan Agreement		2 Aug 1994
Loan Effectiveness	Nov 1994	5 Aug 1994
First Disbursement		19 Aug 1994
Project Completion	31 Dec 1999	1 Jun 2000
Loan Closing		1 Jun 2000
Months (effectiveness to completion)	61	70

**RATES OF RETURN (%)**

	Appraisal	PCR	PPAR
Economic Internal Rate of Return	18.5	20.7	26
Financial Internal Rate of Return (after tax)	10.2	12.6	10

**BORROWER**

Mongolia

**EXECUTING AGENCY**

Mongolian Telecommunications Company

**MISSION DATA**

Type of Mission	No. of Missions	Person-Days
Fact-Finding	1	72
Appraisal	1	114
Project Administration		
Inception	1	25
Review	7	94
Project Completion	1	33
Operations Evaluation <sup>3</sup>	1	42

ADB = Asian Development Bank, ADTA = advisory technical assistance, PCR = project completion report, PPAR = project performance audit report, PPTA = project preparatory technical assistance, TA = technical assistance.

<sup>1</sup> The special drawing rights (SDR) exchange rate depreciated during implementation from SDR1 = \$1.4068 at appraisal to SDR1 = \$1.3845 at loan closing. Hence, the difference in ADB loan amount in ADB loan document and actual.

<sup>2</sup> The Nordic Group consisted of the Government of Norway, the Nordic Development Fund, and the Norwegian Agency for Development Cooperation.

<sup>3</sup> The Operations Evaluation Mission comprised L. Neumann, mission leader, and Arnold Ostevik, staff consultant.

## **EXECUTIVE SUMMARY**

The objective of the Project and of two supporting technical assistance (TA) grants approved in 1994 was to remove the bottlenecks to development imposed by inefficient telecommunications. This was to be achieved through a combination of policy and institutional reform and strengthening and investment. Prior to the Project, Mongolia's telecommunications infrastructure consisted primarily of an aged analog network of fixed lines wholly owned and operated by the Government. Services were limited, manually operated, and of poor quality. Improved telecommunications were expected to help encourage private investment and, consequently, to aid Mongolia's transition to a market-based economy.

Just prior to the Project, the Government set up the Mongolian Telecommunications Company to take over the operation of the telecommunications services. In 1995, shortly after the Project started, the Government partly privatized the Mongolian Telecommunications Company, selling a 40% share to a foreign telecommunications company. The new company became Mongolian Telecom (MT). At the same time, the ownership of all telecommunications assets, including those to be financed under the Project, was transferred to a new entity called the Post and Telecommunications Authority (PTA), leaving MT as the operating entity.

With a few exceptions and with some delays, the Project's expected physical output targets were either achieved or exceeded. The planned digital fixed line network encompassing Ulaanbaatar, Darhan, and Erdenet was expanded beyond appraisal expectations, first by installing larger digital switches and more outside plant in these towns, and second, by installing digital switches in Sukhbaatar, Bulgan, and Avaikheer together with connecting digital trunk lines. The digital network progressively came into operation from late 1996 to 1999, and by 2002 utilization of the switches generally exceeded 90%. Service quality has improved markedly, as expected. MT's financial and management systems were upgraded and technical and other telecommunications personnel in MT and other entities were trained as planned.

The reforms further opened the field of telecommunications to the private sector and competition by selling two licenses for mobile telephone networks in 1996 and 1999 and by registering Internet service providers and other companies. Voice-over-Internet Protocol was also allowed as a means of long distance and international communication. A telecommunications law was passed as expected and revised in 2001, but still has several weaknesses. A regulatory body was formed in 1996, but was part-time and did not function well. In mid-2002, following the passage of the revised Telecommunications Law, a full-time Communications Regulatory Committee was formed. The committee has not been in operation for long enough to demonstrate its strength and independence.

The Project was substantially complete by May 1999, within the anticipated time frame of 5 years. Early delays in procurement, design, and initial works by subcontractors were made up by generally shorter construction and installation periods. The project cost was \$49.08 million, slightly higher than the \$48.60 million appraisal estimate. Although prices for many of the imported items of telecommunications equipment were higher than expected, local installation costs in dollar terms were lower, which enabled more exchanges, trunk lines, and outside plant to be procured than planned without a significant cost overrun. No major problems arose with contractors, suppliers, or consultants.

As a result of the Project and the TAs, telecommunications services and their use have grown substantially. By 2002, about 140 communications and information technology companies were operating in Mongolia, including two fixed line and two mobile telephone

companies. The number of telephones rose from less than 70,000 before the Project to around 376,000 in 2002, with MT having 127,000 customers, the second landline operator having 11,000, and the two mobile operators having 238,000. Most of MT's growth has come from the six towns that benefited from the Project's network improvements. Although the data on telephone use are limited, both fixed line and mobile telephone traffic has increased substantially compared with the situation before the Project. The growth of MT's service has been matched by improvements in quality. The substantial increases in telephone ownership and traffic and the quality improvements indicate that the lack of adequate telecommunications services is not the bottleneck that it once was in the towns that benefited from the Project, a conclusion supported by comments from business operators and other users. The towns supported by the Project are Mongolia's major population and business centers.

MT has operated profitably since its partial privatization in 1995, and each year has paid substantial amounts in income taxes and in dividends to its shareholders. The Project's financial targets were generally met, and MT shows better than mandated efficiency in both technical areas and staffing. It has attempted to improve its business by establishing in-house staff training, by investing small amounts from retained earnings in additional digital switches and other plant and equipment, and by forming a subsidiary Internet service provider. The growth in mobile and Internet-based telephony has affected MT's local fixed line to fixed line and international call businesses, which have stagnated since 2000/01. This does not mean that MT will be forced out of the market, as fixed lines do have advantages, including clarity and low cost for local calls, and its long distance business and calls to and from mobile services continue to increase. However, this growth does highlight the need for appropriate tariff setting, particularly for local calls, for MT to prosper.

Despite the substantial expansion and improvement in telephone services, the expected self-financing of further fixed line network expansion has not occurred on a significant scale. This may be traced, on the one hand, to the split of the fixed line telecommunications assets from operations, which means that MT does not have an asset-rich balance sheet to support borrowing, and on the other hand, to the Government's continued willingness to invest in the sector and whose investments in recent years have amounted to some \$35 million, excluding the Project. The Government does receive substantial amounts—\$79 million during 1995–2002 from lease charges, taxes, and dividends—from MT that more than compensate for its investments; however, these funds flow back as general revenue and are not automatically available for further investment in the sector.

The economic internal rate of return was recalculated for the project investments in network improvement and in building MT's capabilities. The result using revenues to value the main benefits, which ignores some of the consumer surplus benefits, is 26%. The comparable project completion report and appraisal results were 20.7% and 18.5%, respectively. The financial internal rate of return was recalculated to be 10% after tax, which compares favorably with project completion report and appraisal after tax results of 12.6% and 10.2%, respectively, and the rate of 7.45% that the Government charges MT for leasing the telecommunications facilities. The good financial internal rate of return indicates that the field of telecommunications is suitable for private investment.

Lack of data prevent proper quantification of the Project's development impact; however, the Project has clearly reduced communication costs for fixed line users in the Project-supported towns and for those with mobile telephones, and increased overall communication levels. This is primarily because telephone calls now require less time and effort than before because of service quality improvements and the availability of mobile services, and because

telephone use has replaced some of the relatively expensive messenger and face-to-face communications. The Project also contributes to government revenue, which in the early years was an important replacement for support from the former Soviet Union.

The Project did not have any specific pro-poor development goal; rather, its aim was general economic growth. The poor do have access to telephone services through public telephones and privately offered public access points. The development of telecommunications is providing a growing source of employment, mainly in technically skilled jobs, and through the growth of Internet facilities provides added access to information for students and others. The Project did not have any adverse environmental effects. A positive impact is the reduction in fuel consumption that resulted from the installation of solar power units on trunk line repeater stations.

The Project and its two supporting TAs are rated as highly successful. The assistance was and remains highly relevant to development needs, it achieved what it intended, and it did so reasonably efficiently. Most of its achievements are likely to be sustained provided that government policy remains committed to an open, competitive environment, and appropriate tariffs are set.

The most pressing issues in the sector concern setting tariffs, getting the newly established universal service obligation fund operational to facilitate the expansion of services to rural and small urban areas, clarifying the ownership of the telecommunications assets currently assigned to PTA and the related issue of further privatization of MT, ensuring open and unbiased regulation, revising the Telecommunications Law, and updating telecommunications policy for both urban and rural areas. These are not new issues, and the Government is addressing them through working groups and other means.

What does not appear to have been sufficiently debated is the Government's role, particularly that of PTA. Currently, a substantial number of PTA staff is engaged in designing and implementing sector development projects. The latter functions are best left to the telecommunications operators. This is expected to result in lower costs and a better link between tariffs and commercial realities concerning equipment obsolescence. A dynamic sector dominated by private companies has evolved for telecommunications. Under a regime of fair and open regulation, competition will shape the sector further with benefits to consumers in the form of a wide array of well-priced services. Significant government involvement is unnecessary, and the Government could limit its role to guiding the sector by establishing laws and policy and supporting independent regulation.

While the Project succeeded, drawing definite cause and effect relationships that explain its success is difficult. However, the Project appears to have benefited from (i) being large relative to the size of the sector; (ii) addressing all the important aspects of the sector in a comprehensive way, including human resource development and the lack of local expertise, laws, institutional structure, and physical infrastructure; (iii) achieving a good balance between supporting MT and introducing competition to MT; (iv) focusing the expensive investment components on the major population centers and on an existing network, which immediately generated high usage rates; (v) taking place at the right time, that is, when foreign investors were interested in and had the financial capacity to invest in MT and in mobile and other systems; (vi) having relatively stable project management and supervision; and (vii) having the Government make decisions relatively quickly.

The Project also highlights the benefits of reducing the Government's involvement in telecommunications operations and of opening up of the sector to competition from mobile and other services. The latter did not result in the demise or marginalization of the fixed line network. Rather, the opposite is the case. Consistent policy is required from the Government, however. In retrospect, the Government's continued investment in the fixed line network was inconsistent with encouraging MT and its foreign partner to make similar substantial investments.

No issues require specific follow-up actions.



## **I. BACKGROUND**

### **A. Rationale**

1. At the time of project formulation, Mongolia's telecommunications infrastructure consisted largely of an inefficient and outdated analog-based network built up with Soviet support decades previously. A digital exchange in the capital, Ulaanbaatar, and a satellite Earth station for international connections had been established in the early 1990s under bilateral assistance, but were only partly used because of inadequacies elsewhere in the network. The Government, through the Ministry of Infrastructure Development, was responsible for all the design, implementation, management, and operations of the telecommunications network. The sector lacked any legislative framework, including for guiding private sector involvement. Services other than voice telephony, telegrams, and telexes were almost nonexistent; call completion rates were low; network congestion led to high levels of shared services; and automated systems, such as international and long distance direct dialing, were impossible. Billing and administrative systems were manual and outmoded, and few staff had training in digital telecommunications systems. The poor telecommunications system was viewed by Government as a major disincentive to domestic and foreign private investment in Mongolia, and consequently as a constraint to the ongoing transition from a command to a market-based economy. Improvement of the telecommunications sector was deemed by Government to be a national priority.

2. Improving the telecommunications sector had added significance for Mongolia because it is landlocked and because of its small and scattered population. Telecommunications was also a potential source of revenue for the Government, an important consideration at the time in view of the cessation of Soviet support.

### **B. Formulation**

3. The Project came about as a result of technical assistance (TA) funded by the Asian Development Bank (ADB) in 1992 to prepare a master plan for the development of the telecommunications sector that covered policy, an institutional framework, and capital investment.<sup>1</sup> The master plan also included a feasibility study for an immediate investment that became the Project. Following the 1992 study, policy dialogue between ADB and the Government led to the formulation of a broad program of policy change, sector restructuring, and institutional development. As part of the restructuring, and prior to the start of the Project, the Government set up the Mongolian Telecommunications Company (MTC) and the Mongolian Data Company as government-owned corporations to take over the provision of telephony and data services from the Ministry of Infrastructure Development. The Project and two complementary TAs,<sup>2</sup> approved along with the Project, were seen as important supports for this broad program and MTC.

4. The Project was appraised in 1994 and became ADB's sixth loan to Mongolia. ADB has not been involved in subsequent development of the sector, although it did support telecommunications facilities under the National Air Navigation Development Project.<sup>3</sup> The air navigation facilities serve a specific need in relation to air traffic operations and are not available

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<sup>1</sup> TA 1686-MON: *Telecommunications Development*, for \$600,000, approved on 1 April 1992.

<sup>2</sup> TA 2101-MON: *Telecommunications Sector Reform*, for \$588,000, approved on 16 June 1994; TA 2102-MON: *Accounting and Management Information Systems and Tariff Reform*, for 599,000, approved on 16 June 1994.

<sup>3</sup> Loan 1370-MON(SF): *National Air Navigation Development Project*, for \$24 million, approved on 5 September 1995.

for use by the general public. Most subsequent assistance to the telecommunications sector has been provided by the Kreditanstalt für Wiederaufbau (KfW), Japan, and the Republic of Korea.

### **C. Purpose and Outputs**

5. The Project is closely intertwined with its two associated TAs and with ADB's policy dialogue at the time with the Government, all of which had the joint purpose of removing bottlenecks to development imposed by inefficient telecommunications. At appraisal, the Project's primary objective was appropriately classified as economic growth. The Project's purpose has two key dimensions: first, achieving immediate improvements in telephony and related services, and second, improving the sector's structure and management to maintain efficiency and extend it over time. To achieve their purpose, the Project and the TAs were to (i) establish an appropriate framework for the sector that provided for the promulgation of a telecommunications law, the separation of telecommunications from other operations, and the introduction of private sector activity, competition, and regulation; (ii) improve the telecommunications fixed line network in the main population centers; (iii) establish a commercial orientation within MTC; and (iv) provide human resource development within MTC and other entities in the sector.

6. The Project's focus was on network improvement, the commercial reorientation of MTC, and human resource development. As concerns network improvement, the Project financed equipment, cables, civil works, and consultants to arrest the degradation of the existing network, digitize selected telephone exchanges and trunk lines, provide other trunk line improvements, and replace and expand old outside plant,<sup>4</sup> which would replace the majority of the analog system with a digital one and allow modest expansion to meet demand to 2000 in Ulaanbaatar, Erdenet, and Darhan, Mongolia's major urban and industrial areas. The Project also financed efforts to commercialize MTC by supplying equipment for improved billing and management information systems; consultants and training for upgrading corporate planning; and consultants and overseas training for human resource development in MTC, the Ministry of Infrastructure Development, and the regulatory body. Using equipment supplied under the Project, one of the two TA grants (footnote 2) approved along with the project loan aimed to help MTC establish an accounting and management information system and a tariff review capability as part of MTC's commercial reorientation. The aim of the other TA was to help the Government implement policy, sector, and institutional reform, including developing legislation, setting up a regulatory body, preparing for the privatization of MTC, and introducing new services.

### **D. Cost, Financing, and Executing Arrangements**

7. At appraisal, the total project cost was \$48.6 million, for which ADB approved a loan from its Asian Development Fund of SDR17.42 million (then equivalent to \$24.5 million) on 16 June 1994. ADB's funds were to finance the outside plant, the accounting and management information system equipment for MTC, and the consultants for part of the human resource development component and for project management support. Cofinancing was arranged as follows: \$11.8 million from the Nordic Group (consisting of the Government of Norway, the Norwegian Agency for Development Cooperation, and the Nordic Development Fund), mainly for trunk line improvement, public call boxes, emergency spares for the existing network, and consultants for the commercialization of MTC and part of the human resource development

<sup>4</sup> Outside plant refers to the primary and secondary cable network and its associated infrastructure, such as cabinets and ducts that connect individual customers to the exchanges. It does not include the wires leading from the service connection point into the customer's building or the customer's telephony equipment, which are referred to as customer equipment.

component; and \$6.42 million from KfW for the digital exchanges. MTC was to finance \$5.88 million or 12% of the Project. The Government was to re-lend part of ADB's loan to MTC at a variable rate equivalent to that for multicurrency loans from ADB's ordinary capital resources over a period of 25 years, including a 5-year grace period. MTC was to bear the foreign exchange risk of the re-lent portion. Similar re-lending conditions were applied to the portions of the Nordic Group and KfW funds re-lent to MTC.

8. MTC was the executing agency for the Project and for the institutional strengthening TA, and was to establish a project implementation unit for this, while the Ministry of Infrastructure Development, the ministry responsible for the telecommunications sector, was the executing agency for the sector reform TA. In mid-1995, the Government split MTC into the Mongolian Communications Assets Company, which took over ownership of the country's telecommunications assets, including those financed under the Project, and Mongolian Telecom (MT), which leased the assets to provide basic telephony services. At the same time, MT was partly privatized through the sale of 40% of the company to Korea Telecom. The Mongolian Communications Assets Company was subsequently renamed the Post and Telecommunications Authority (PTA). MT and PTA took over MTC's executing agency role.

## **E. Completion and Self-Evaluation**

9. The Project was substantially complete by mid-1999, but the loan was kept open until June 2000 to facilitate final payments to contractors and equipment suppliers. The project completion report (PCR) was circulated in August 2001. The PCR rated the Project and the two TAs as successful. This rating was based primarily upon assessed improvements in the range of telecommunications services and in their capacity and quality, the institutional improvements within MT, and MT's achievement of good financial performance and service capability. To support its assessment, the PCR provided statistics showing the achievement of outputs and changes in the number of customers and in network performance indicators, financial accounts for MT, and reestimated economic and financial internal rates of return. The PCR also noted that sector reform had progressed along the lines expected with the separation of functions, the removal of some cross-subsidies, the drafting of legislation and operational guidelines, and the sale of licenses to establish two independent mobile telephone networks. An important exception was that the regulatory body had not yet been made operational. The PCR assessment is credible, albeit limited to a short period of operations. The PCR concludes with a lesson pertinent to the further privatization of MT and several recommendations for the sector.

## **F. Operations Evaluation**

10. This project performance audit report (PPAR) draws on project records, discussions with ADB staff, and information obtained by an Operations Evaluation Mission (OEM) to Mongolia in August 2003. The OEM visited sites in four of the towns covered by the Project as well as in nonproject towns and met with staff of the Government, government-owned corporations, MT and other telecommunications and Internet service providers, and with telecommunication users. The PPAR assesses the relevance of the Project, the efficacy and efficiency of its achievement in terms of its outputs and their purpose and sustainability, and the Project's institutional development and other impacts. The PPAR covers both positive and negative aspects and identifies lessons for future ADB operations. This report reflects the views of pertinent ADB departments and offices and of the executing agencies on an earlier draft of the PPAR.

## II. PLANNING AND IMPLEMENTATION PERFORMANCE

### A. Formulation and Design

11. Given the poor state of telecommunications at the time the Project was conceived, the ongoing transformation of the economy, and the support that efficient communications can give to business and development operations, the Project and the two associated TAs were timely and highly relevant to Mongolia's needs. Both the Government and ADB viewed telecommunications development as a priority. Beginning with the 2000 country operational strategy, ADB's priorities shifted away from the telecommunications sector because of a narrowing of its focus on a small number of sectors. ADB still viewed efficient telecommunications as important, but as this sector was no longer the bottleneck that it had been in the early 1990s, ADB believed that it could shift its focus. Nevertheless, the Government still accords priority to the development of telecommunications, subsequently sought and received several loans and grants to extend the digital network, and views rural telecommunications development as an important goal.

12. Several positive aspects of the design of the Project and the TAs are worth noting. First, the assistance was appropriate in addressing the main deficiencies in the sector in a comprehensive way. Second, the expensive network improvements were limited to the major population and industrial centers where efficient telecommunications would have the greatest impact in supporting transition and development. Third, the extent of network improvements was kept modest in view of the difficulties in estimating demand at the time of project design and in view of the need to limit the size of the loan to Mongolia's capacity at that time. The limited coverage and extent of improvements contributed to the high degree of utilization of all facilities soon after they were in place. Fourth, as well as addressing immediate communication needs, the Project supported the opening up of telecommunications to the private sector to encourage other services and competition. This has driven the sector well beyond project expectations to encompass a diversity of mobile, fixed line, and Internet-based communication systems and a high degree of competition. The rapid development of the mobile and Internet operations was made possible by the initial improvements to the fixed line telephone network, which provided a population of telephone customers that the first mobile telephone users could connect to, and the basic infrastructure that the first Internet service providers could use.

### B. Achievement of Outputs

13. All inputs were supplied and all activities were conducted as designed. With a few exceptions, the expected physical output targets were either achieved or exceeded. The sectoral and institutional targets were generally met, but delays did occur and some quality weaknesses are apparent.

14. A telecommunications law was passed and was revised in 2001 to correct some inadequacies; however, a 2003 World Bank review noted that the revised law still contains weaknesses, a conclusion supported by the OEM's brief review of the law. Important weaknesses are the inclusion of postal matters along with telecommunications, the vagueness about the collection of monies for the universal service obligation fund,<sup>5</sup> having the fund's expenditure controlled by the nonindependent PTA, and the lack of specificity about the links

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<sup>5</sup> The purpose of this fund, which is incorporated in the Telecommunications Law, is to enable the collection of monies from telephone operations in profitable areas, i.e., larger urban areas, to subsidize loss-making operations in nonprofitable areas, i.e., smaller urban and rural areas.

between service providers and state-owned enterprises. The Government has issued policy statements from time to time that have countered weaknesses in the law.

15. Key functions of the sector were separated by setting up different functional entities. A major achievement, which occurred prior to the Project, was the formation of MTC, but the changes also include the formation and partial privatization of MT and the separation of postal and other operations from telecommunications. MT still retains some broadcasting functions, but these are related to transmission and not to content creation. A regulatory body was created in 1996, but operated part-time and did not function well. In mid-2002, following passage of the revised law, the full-time Communications Regulatory Committee (CRC) was formed. While constituted as a permanent, independent body and funded from license fees rather than from the Government's budget, the CRC has not operated long enough to demonstrate its independence or strength. Private sector operators remain skeptical about the CRC's ability to fulfill its mandate. Regulation is new to Mongolia and not all in the Government understand its role. The CRC is also a unique type of entity that is neither private, a government corporation, nor part of the standard bureaucracy, which does not fit well into current government classifications and causes confusion in interpreting how it may go about certain functions.

16. In 1995, the Government proceeded ahead of schedule and partly privatized MTC, selling a 40% share to a foreign telecommunications company.<sup>6</sup> The new company became MT. At the same time, the ownership of all telecommunications assets, including those financed under the Project, was transferred to PTA, leaving MT as the operating entity. At the time, the Government did not want to sell national assets to foreign private parties, and was concerned that MT might exercise its monopoly position and prevent new operators from using the facilities. ADB reluctantly accepted the Government's decision to split asset ownership from operations; however, the split has not prevented MT or the sector from developing, albeit in some unexpected ways (paras. 29–37). MT obtained an operating financial management system and a rudimentary management information system. Weaknesses in the contract with the private investor in MT have been revealed by the investor's failure to provide the substantial added investment and expertise to MT indicated in the business plan that formed part of the agreement for the purchase of its shareholding, and the limited degree of privatization means that the Government is still heavily involved in decision making, causing delays and some noncommercial decisions. Nevertheless, MT's basic operations reflect those of a private entity with strong marketing, planning, and financial control.

17. A modern digital network was built that encompassed six towns. Originally, the Project's scope included only Ulaanbaatar, Darhan, and Erdenet, but because of lower than expected overall costs for installed equipment, the towns of Sukhbaatar, Bulgan, and Avaikheer were included. In all six towns, digital exchanges were installed to replace and expand old analog capacity.<sup>7</sup> In Ulaanbaatar, Darhan, and Erdenet, new outside plant was installed to replace most of the old plant and provide for new connections, with the focus correctly being on replacing old primary network rather than the secondary network.<sup>8</sup> The installed outside plant capacity exceeded appraisal targets. Digital trunk lines, more than originally planned, were built to connect the six towns using the old analog system alignment and towers, and solar power units were installed at 25 trunk line repeater stations to reduce the cost of diesel generation of power. The number of solar power units was less than the planned 43 because of the higher than

<sup>6</sup> Subsequently, 5.6% of the company was sold to MT staff and other individuals in Mongolia.

<sup>7</sup> Because of long waiting lists and some other reasons, not all the analog switches were removed, and some continued to operate alongside the new digital ones.

<sup>8</sup> Subsequently, MT and the Government have replaced more of the older secondary network, leading to further improvements in overall service quality.

expected cost per unit. A total of 200 public telephone boxes was installed, fewer than the planned 400 because of higher unit costs. Appendix 1 presents the major physical achievements of the Project. The digital network came into operation between late 1996 and 1999.

18. Data for the individual exchanges established under the Project shows that all are well utilized, with generally more than 90% of available lines being in operation in 2002, and that the high rate of utilization was reached quickly. Industry standards suggest that a utilization rate of more than 80% is good. Similarly, all the outside plant established under the Project is in operation. Comments from users indicate a high level of voice clarity and statistics show a low incidence of faults.

19. A basic level of understanding of digital telecommunications was instilled in a significant proportion of Mongolia's technical staff, and also in some of MT's nontechnical staff. As of 2003, few of these staff had left the sector, and most were still working in the same area as at the time of training.

20. The basis for competition and customer choice through the entry of other services was established by selling two licenses for mobile telephone networks. The sector was further opened up by subsequently registering Internet service providers and other companies and allowing Voice-over-Internet Protocol as a means of long distance and international communications.<sup>9</sup>

### **C. Cost and Scheduling**

21. The project cost was \$49.08 million, slightly higher than the \$48.60 million appraisal estimate (Appendix 2). The major cost components were the outside plant, the digital exchanges, and the trunk lines. These components were procured as packages for the supply and installation of equipment. International competitive bidding was used for the ADB-financed outside plant component, and local competitive bidding in the country of the cofinancier was used for the other components. During the implementation period, both the rate of local inflation and the depreciation of the local currency were substantial. The outside plant cost more than expected, and ended up accounting for 49% of the project cost. The initial tenders for outside plant were higher than expected and led to a reallocation of funds to the outside plant component; however, when savings in the dollar value of the local installation costs became apparent, rather than reallocating the savings back to contingencies, additional outside plant was procured. For the digital switches, which represented about 11% of actual total costs, lower tender prices and subsequent lower dollar costs for installation produced savings that were used to procure additional switches. Local cost savings in dollar terms also enabled an increase in the total length of microwave trunk lines. The latter accounted for a further 15% of the total project cost. Higher costs for imported equipment led to a reduction in the number of call boxes and solar power units. Significantly more than expected was spent on building improvements, including two small, new buildings for remote subscriber units. Changes occurred in the mix of consultancy inputs procured, but overall consultancy inputs were close to expectations.

22. The PCR describes planned and actual financing arrangements in detail and Appendix 3 reproduces the PCR's financing data. Some small changes took place, namely, the funding of

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<sup>9</sup> Voice-over-Internet Protocol uses Internet connections to enable customers to talk to each other and take advantage of the low cost of international Internet links. It can be set up to operate through headsets connected to a computer or to a standard telephone unit.

emergency spares was transferred from the Nordic Group to MT and KfW funded consultants for some of the human resource development although this was not included originally. Overall, foreign financing exceeded expectations and local contributions were less than estimated. The latter was primarily due to the lower than expected cost for local inputs. ADB's loan amount of SDR17.415 million was almost fully utilized, with \$24.01 million being disbursed.<sup>10</sup>

23. The Project was substantially completed in May 1999, close to expectations and within the anticipated time frame of 5 years. The loan was closed in June 2000. The Government of Norway's grant for consulting services has been kept open, as unused funds have been allocated to assist the Government with further privatization of MT.<sup>11</sup> The good overall implementation performance masks delays in procurement, design, and initial works by subcontractors. These delays were compensated for by generally shorter construction and installation periods. The most significant delay was the 2-year delay in the procurement of radio equipment for the digital trunk lines.

#### **D. Procurement and Construction**

24. Difficulties were encountered with the turnkey supplier for the digital exchanges because of a large number of problems at the acceptance test and the need to repeat the testing. Nevertheless, the situation was eventually rectified. Not all staff of the contractor hired to train trainers were skilled teachers or fluent in English, the medium of the training. Nevertheless, technicians contacted by the OEM said they had gained valuable knowledge from the training. Generally, the contractors and suppliers for the Project were judged to have performed satisfactorily and no procurement- or construction-related problems affected the quality of the project outcome.

#### **E. Organization and Management**

25. MTC, and following its split-up in 1995 both MT, which was responsible for physical implementation, and PTA, which focused on contractual, financial, and organizational matters, performed satisfactorily as executing agencies. The division of MTC into two executing agencies does not appear to have affected project implementation.

26. Most loan covenants were adequately complied with. Notable exceptions were the delay in establishing an effective regulatory body, a loan for additional investment in the sector that was obtained without first securing ADB's approval, and the failure to follow arrangements for passing on the loan's foreign exchange risk and securing foreign exchange for loan repayment. These failures have not unduly affected the Project's performance. Some of the training of regulators has been lost, because the regulatory body was not functional when the staff returned from training, and some of these personnel have now been assigned elsewhere.

27. At appraisal, MTC was expected to become the owner of the assets and to assume the responsibility for loan repayment under a subsidiary loan agreement with the Government. That agreement also required MTC to assume the foreign exchange risk by repaying the Government in foreign exchange. These arrangements were adopted because of MTC's potential for earning foreign exchange from settlements with foreign telephone companies and because of the need

<sup>10</sup> The loan amount was equivalent to \$24.5 million, but this became \$24.02 million by project completion because of the change in the SDR to US dollar exchange rate.

<sup>11</sup> At the time of reporting, approximately \$56,000 remained undisbursed.

to incorporate the foreign exchange risk into commercial arrangements and telephone tariffs.<sup>12</sup> With the split of MTC into two entities, the use of the assets was governed by a lease arrangement between MT and PTA. The lease payment was expressed and paid for in local currency, using the prevailing exchange rate. Thus, the foreign exchange risk was still passed on to MT, and through it to consumers, but the responsibility for obtaining foreign exchange for debt repayment reverted to the Government.<sup>13</sup>

28. Many consultants were recruited under the Project and the two TAs for project management support; for the design of financial, management information, and tariff review systems; for the preparation of corporate and human resource plans for MT; for assistance with the privatization of MT; for the preparation of the Telecommunications Law and the formation of the regulatory body; and for guiding the process for issuing licenses to mobile telephone operators. Although not planned at appraisal, consultants were also engaged to design the digital switches and provide additional training to MT staff. Prior to the Project, Mongolia had limited expertise and experience in such matters, and the large consultancy input was appropriate to compensate for such weaknesses.

### **III. ACHIEVEMENT OF PROJECT PURPOSE**

#### **A. Operational Performance**

##### **1. Growth and Use of Telecommunications Services**

29. Telecommunications services and their use have grown substantially since the start of the Project. Compared with just one telephone and one data company in 1995, in 2000 Mongolia had about 100 communication and information technology companies in operation, and by 2002 this number had risen to 140. The current companies include two fixed line companies, two mobile telephone companies, and seven Internet service providers.<sup>14</sup> One fixed line and one mobile service each provide almost universal coverage of urban areas, and altogether the country has at least eight different services for communicating internationally, including four Voice-over-Internet Protocol services. Interconnections among the various networks and sharing, through leasing, of basic trunk capacity occurs. The number of telephones grew substantially from less than 70,000 before the Project to around 376,000 in 2002 (Appendix 4). MT's fixed line telephone customers grew from fewer than 70,000 at the start of the Project to almost 127,000 in 2002, and 76% of this growth has come from the six areas that benefited from the Project's network improvements. Mobile telephone ownership increased dramatically since the start of services in 1996 to around 238,000 units in 2002. The second fixed line operator had a further 11,000 customers. Even though the number of public call boxes is modest, entrepreneurs provide public call facilities through fixed lines in, for example, shops and from wireless sets connected to wireless local loops.

<sup>12</sup> Historically, Mongolia had substantially more incoming calls than outgoing calls, and net settlements were in Mongolia's favor.

<sup>13</sup> In retrospect, if the lease payments had been fixed in foreign exchange, MT would not have been able to secure sufficient foreign exchange from its international earnings after 1997 when these began to fall, forcing it to buy substantial amounts locally: \$2.5 million in 1998 increasing to more than \$6 million in 2002.

<sup>14</sup> Fixed line services are provided by MT and the Mongolian Railways Company. The latter connects customers near the railway to its fiber optic cable, and thence to MT's network or to circuits in Russia or the People's Republic of China. At this stage, the Mongolian Railways Company's network is small, with around 11,000 customers in 2002. The fiber optic cable was established primarily for railway signaling. The first mobile operator, Mobicom, started in 1996, and by 2002 accounted for 81% of the 238,000 mobile customers.

30. The number of telephones in 2002 equates to a telephone penetration rate of 15 telephones per 100 people, of which about 5 are MT's fixed lines (Appendix 4). This places Mongolia ahead of countries such as Viet Nam and slightly behind countries such as the Philippines and Thailand. Most industrial countries have penetration rates of more than 100 telephones per 100 people. Within the six towns supported under the Project, penetration rates for MT's fixed lines are 7 to 10 telephones per 100 people, but outside these areas the rate is typically less than 3 telephones per 100 people. The distribution of mobile telephones is unknown, but people in the six project towns appear to own a large proportion of them.

31. The available information about telephone use is limited to MT's fixed line customers and is broken into local, long distance, and international outgoing traffic (Appendix 5).<sup>15</sup> Mobile telephone use is recorded by the cellular companies, but was not made available to the OEM. The available data show that MT's fixed line traffic has grown significantly since 1996–1997, particularly for long distance calls. Local call traffic grew from 1997–1999, then stagnated. The local call category is a new category that started with the installation of digital lines. Prior to the Project, local call traffic was not recorded. Comments made to the OEM by telephone users and MT staff suggest that telephone use for local calls has increased compared with the situation before the Project. The growth in local call traffic over preproject levels and for 1997–1999 coincides with the commissioning of the digital exchanges and the improvement in service, but the reason for the lack of growth since 1999 is not as clear. Almost full utilization of the Project's exchanges and outside plant was achieved quickly, limiting the scope for adding new customers, and local call demand by existing and new customers may have been met by 1999, dampening further growth. The 2000–2001 period was also one of poor economic performance, which may have stalled growth. A third possibility exists, however. Local call traffic is the traffic between fixed line customers and does not include calls from fixed line to mobile telephones. In view of the large number of mobile telephones and the large and increasing net payments to MT from interconnections, as shown in MT's financial statements, the number of such calls is likely to have been significant. Thus, the apparent stagnation in local call traffic may have been due to a partial switch in favor of fixed line to mobile calls in place of fixed line to fixed line calls as mobile telephones became more common.

32. In a similar manner as for local calls, international traffic grew strongly until 2000, and then stagnated. The six project towns account for 97% of MT's international outgoing traffic, and as for local traffic, the growth in outgoing international traffic coincided with the establishment of the Project's facilities. The subsequent stagnation coincided with increasing competition from alternative international gateways. International incoming calls handled by MT follow a similar pattern, namely, significant growth during 1996–2001, followed by stagnation and, from late 2002, decline. Comments made to the OEM by telephone users and industry personnel suggest that the decline in MT's incoming international traffic from late 2002 was caused by the growth in the use of non-MT gateways for both outgoing and incoming international traffic, fueled by aggressive marketing and the formation of linkages between local and foreign services, particularly by the cellular companies. The lack of growth in MT's outgoing international traffic is not considered indicative of the sector's overall performance, which includes mobile telephone and other services.

33. In contrast with local and international calls, MT's long distance traffic grew strongly throughout the 1996–2002 period. While the Project was a major factor until 2000, since that

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<sup>15</sup> MT's international outgoing traffic also includes calls originating from other services, e.g., Mobicom, but passing through MT's international gateway.

time new digital exchanges have come into operation in nonproject areas, explaining the continued rise in long distance traffic.

34. Even though the data are limited, clearly both fixed line and mobile telephone use has increased substantially compared with the situation before the Project. Initial growth is directly linked to the Project's investment in the digital fixed line network and MT's capabilities, and subsequent growth has mostly involved mobile services encouraged by the Project and, for long distance traffic, postproject investment. Without the Project, telephone traffic growth would have been significant only for local and international calls in that part of Ulaanbaatar served by the E10B digital exchange installed in 1992–1993. Long distance traffic and local calls in other areas probably would have declined as the old analog services deteriorated. The substantial increases in telephone ownership and traffic imply that the lack of adequate telecommunications services is not the bottleneck that it once was for the major population centers. Discussions with business operators in Mongolia's three major towns (which account for 40% of the country's population and the bulk of business entities) support this conclusion.<sup>16</sup>

## **2. Quality of Mongolian Telecom's Fixed Line Service**

35. The growth of MT's service has been matched by improvements in quality. Specific quality indicators include the number of faults per customer per year, the percentage of faults cleared within 24 hours, and call completion rates, all of which improved during 1997–2002 (Appendix 6). Improvements were greatest for those centers where the outside plant was replaced when digital exchanges were installed and least for those areas that still relied on old outside plant and analog exchanges.<sup>17</sup> The similar but smaller improvement that also occurred in analog-based areas suggests that the procurement of spare parts under the Project and better maintenance practices and management also had an effect.

## **3. Sector Self-Financing**

36. Whereas a significant proportion of the population now has access to good telecommunications services, the digital network does not extend everywhere. In addition, some of the towns served by the Project are experiencing significant waiting lists for fixed digital lines,<sup>18</sup> and mobile telephony, which accounts for a substantial number of telephones, is relatively expensive and not everyone can afford it. As indicated in para. 30, the service coverage limitations are reflected in the overall penetration rate of 15 telephones per 100 people in 2002.

37. For some of those people who are not yet connected by means of digital or mobile services, inadequate telecommunications may still be a problem. With the privatization of MT and the entry of private sector mobile operators, the telephone service companies were expected to finance much of the expansion of the digital network to cater to these people, relieving the Government of this burden. This is happening in the fields of mobile telephony, the Internet, and other value-added services, but the development and expansion of the fixed line network is still seen as a government responsibility. Even though the private investor in MT proposed making significant capital investment in fixed line telephony, this has not occurred,

<sup>16</sup> Approximately 25% of MT's fixed line customers, which account for around 60% of telephone revenue, are businesses and government entities.

<sup>17</sup> For example, the number of faults per customer per year in Ulaanbaatar, Darhan, and Erdenet, where substantial parts of the old outside plant were replaced, are less than 1, whereas in Bulgan, Avaikheer, and Sukhbaatar, where the outside plant was not replaced under the Project, the number is 1 or more.

<sup>18</sup> Erdenet, for example, had a total of 6,720 customers in 2003 and a waiting list of about 3,500.

with the investor's support being limited primarily to working capital loans to MT. MT does spend some \$1 million to \$2 million per year of its retained earnings on capital works, including some outside plant and exchange expansion, and did invest in satellite-based trunk facilities; however, this amount is small in comparison with the Government's contributions subsequent to the Project, which with foreign assistance and loans from KfW, the Republic of Korea, and Japan have amounted to around \$35 million for expanding the digital trunk line and replacing analog exchanges with digital exchanges in nonproject centers. The Government has also provided about \$1 million to \$2 million per year of its own funds for new and replacement outside plant and other small fixed line network development needs.

38. The lack of substantial self-financing for fixed line network development may be traced to the split of the fixed line telecommunications assets from operations and the Government's retention of the ownership of those assets. The operator, i.e., MT, does not have a large asset-rich balance sheet to support extensive borrowing, and MT's foreign partner may not consider a 20-year lease of the existing telecommunications assets as giving sufficient surety to warrant substantial investment in other fixed assets, which would have little value if the existing assets were withdrawn. However, given the Government's willingness to borrow for fixed line telecommunications, MT and its foreign investor do not have to. During 1995–2002, the Government received around \$79 million from MT, of which \$48 million was from lease charges for assets used by MT,<sup>19</sup> \$26 million was for income taxes, and \$5 million was in the form of dividends. Given this flow back to the Government, one could argue that the sector is self-financing, but except for the lease payments until 2001, the funds flow back as general revenue and are not automatically available for further investment in the sector. Moreover, the current government lease arrangements are inappropriate for a competitive telecommunications sector, and self-financing of future development needs by service operators would be preferable (para. 66).

#### **4. Sector Regulation**

39. Key elements for sound performance of the telecommunications sector are the setting of tariffs, the allocation and use of radio frequencies, and the management of interconnection arrangements and prices among operators. These are normally the functions of an independent regulator operating under the guidance of established national laws and policies. To date, the Mongolian telecommunications sector has developed without an effective regulator. An independent regulator, the CRC, was only established in June 2002. Sector development was possible because of the guidance provided by the periodically updated master plan for the sector, the abundance of growth opportunities for all operators, the absence of conditions that allowed any of the operators to exercise monopoly control, and the substantial consulting inputs under the Project and the TAs. As an example of the latter, consultants designed the initial cellular operator licenses and the process for selecting licensees, which otherwise might have been done by a regulator. However, the market is maturing, making competition and the seeking of monopoly advantages more likely, and large inputs by consultants cannot be expected in the future. Further development and operation of the sector would benefit from a strong and independent regulator, particularly if MT is fully privatized and has ownership of the Government's trunk lines. The newness of the CRC prevents an assessment of its capability; however, independence is possible, because the CRC's budget is derived from licensee fees, and its members are appointed by the prime minister and cannot be removed until their 6-year terms expire. Unfortunately, most CRC members are drawn from the Government, with three of

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<sup>19</sup> These include both project assets and nonproject-funded assets.

the seven coming from either the Ministry of Infrastructure or PTA. A better balance would have been achieved if consumer groups were also represented.

## **B. Performance of the Operating Entity**

40. MT has operated profitably since its partial privatization in 1995, and each year has paid substantial amounts of income tax and provided dividends to its shareholders (Appendix 7).<sup>20</sup> Its net fixed assets and investments increased from some MNT2 billion in 1995 to around MNT16 billion (about \$14 million) in 2002, primarily financed by retained earnings. Financial targets established at the time of appraisal included a working ratio of no more than 47% and accounts receivable of less than 45 days of billed revenues.<sup>21</sup> The working ratio has been reasonably well achieved, and in 2002 was 43%. The accounts receivable target was not always achieved, but in 2002, was down to 37 days.

41. While MT has enjoyed a sound financial position so far, the future is not as clear, however, and will depend on how well tariffs are set and how the tariffs relate to changes in market conditions and competitive forces. An important competitive area is that of international traffic. In the past, international traffic generated a high proportion of MT's profits and enabled MT to offset losses on local calls, where the tariffs do not cover actual costs. Part of the reason why local call tariffs are below cost is the high cost of operating the analog part of the network, which is manually operated and covers a vast, sparsely populated area. Competition since 1996 has caused international tariffs, and hence the profit levels inherent in those tariffs, to decline; however, the international tariffs still contained a positive profit margin, which coupled with a reasonably high level of international traffic has provided for overall company profitability.<sup>22</sup> More recently, aggressive competition for incoming international traffic has resulted in a dramatic decline in MT's share of this business activity from late 2002. While MT has been able to maintain its outgoing international traffic at historic levels, the decline in incoming call traffic, should the trend continue, will reduce overall profitability and will probably result in MT having a net outflow for international settlements for the first time in its history. The growing competition from mobile and Internet-based telephone services does not mean that MT will be forced out of the market, as fixed lines do have advantages, including clarity and cheap local calls. However, appropriate tariff setting will be important to help MT maintain this service and a viable position in the sector. In setting tariffs for MT, tariff increases must not be used in place of measures to increase efficiency. The proper balance between efficiency and profitability in setting tariffs is important and underlies the need for a strong, unbiased regulator.

42. MT's efficiency shows better than mandated achievement in both technical areas (para. 35) and staff levels. In 2002, MT had 33 staff per 1,000 telephone lines (Appendix 8), which is better than the ratio of 42 expected at project completion. Areas with mostly digital services exhibit higher rates of staff efficiency, for example, Erdenet, where the number of analog lines is less than 10% of the total, has only 17 staff per 1,000 lines. As more areas are digitized, i.e., automated, operating efficiency is likely to improve further.

<sup>20</sup> Even though they are audited, MT's accounts do not appear to be maintained according to international standards. Significant revenue, such as the portion of call charges collected from its customers for calls to other services to be passed onto those other services, together with the corresponding expense, are not recorded. Some of Micom's (an Internet service provider) indirect expenses also appear to be included with those of MT. Nevertheless, the overall picture of financial performance is relatively clear.

<sup>21</sup> The working ratio is the ratio of expenses used in telecommunications operations to revenues from telecommunications operations.

<sup>22</sup> International call tariffs declined from around \$4–\$5/minute in 1995 to \$0.7–\$0.9/minute in 2002.

43. MT has also attempted to improve its business in various ways. It established a capability for in-house staff training and conducts training courses each year. It has invested small amounts from retained earnings for additional digital switches and outside plant; has established a subsidiary Internet service provider, known as Micom; and has tendered for the third mobile license offered by the Government. Clearly, MT has a strong business orientation and is conscious both of the need to maintain its fixed line business and of the limitations this imposes.

### **C. Economic and Financial Reevaluation**

44. The economic internal rate of return (EIRR) was recalculated for the project investments in network improvement and in building MT's capabilities (Appendix 9). As main benefits, the Project enabled the replacement of some of the alternative, more expensive forms of communication, such as the use of messengers and face-to-face contact, with lower-cost telephone communication; reduced the time and cost involved in without project levels of telephone communication; and generated extra telecommunications. These benefits were quantified on the basis of the amounts MT's customers paid for the improved and expanded services. While simple, such an approach does not include the entire consumer surplus and underestimates the result. Additional benefits accrue because of the incremental use of the telecommunications facilities for broadcasting, telegrams, and other nonvoice uses and because of operational cost savings. The latter include the reduction in fuel consumption brought about by the use of solar power in the trunk line repeater stations. The EIRR was recalculated to be 26% (Table A9.2).

45. The PCR adopted a similar revenue-based method, but used a different approach for determining operating costs and benefits and estimated the EIRR at 20.7%. In a second analysis, the PCR recalculated the EIRR by applying economic valuation factors to the revenue streams to reflect the higher economic benefits expected from improvements to nonincremental traffic compared with incremental traffic,<sup>23</sup> yielding a result of 26%. A comparable operations evaluation analysis using this methodology yielded an EIRR of 30% (Table A9.3). The appraisal EIRR expectation was 18.5%, using a revenue-based model that used incremental customers, telephone calls, and tariffs to quantify the main benefits. While variations in methodology and results exist among the various analyses and some methodological weaknesses are apparent, the consistent message is that the investment is economically viable.

46. The financial internal rate of return (FIRR) was recalculated to be 10% after tax and 18% before tax (Appendix 10). The local call tariff has not been increased since 2001, and an increase in this tariff to MNT14/minute from 2004 onward would increase the FIRR, after tax, to 11%. The FIRR was based on incremental costs and revenues taken from MT's financial results. Note that telecommunications asset ownership and operations have been separated, and the FIRR represents the return to the combined MT operation and PTA asset ownership. The FIRR may be compared with the rate of 7.45% charged to MT by the Government for the lease of the telephone assets.<sup>24</sup> The reasonable after tax FIRR highlights the suitability of telecommunications for both private ownership and operation, particularly in view of the private sector's flexibility and ability to minimize costs through, for example, the use of second-hand

<sup>23</sup>For a discussion of economic valuation factors see ADB. 1997. *Guidelines for Economic Analysis of Telecommunications Projects*. Manila. Problems are associated with this methodology, including its use without extensive consumer research.

<sup>24</sup>This rate, which exceeds the Government's borrowing costs, is equivalent to MT's average cost of capital. The leased telecommunications assets have a value of around \$100 million, whereas MT's borrowing is on the order of \$3 million.

equipment, which could produce an even higher result. The PCR analysis was done on an after tax basis and yielded a result of 12.6%. At appraisal, an after tax FIRR of 10.2% was expected.

#### **D. Sustainability**

47. Mongolia's diverse and dynamic telecommunications industry can be sustained provided that the Government's policy remains committed to an open, competitive environment. Not all businesses will survive, or survive in their current form, but the industry and its dynamic nature probably will. Key to this will be making the CRC an effective and independent regulator.

48. The fixed line service operated by MT will survive despite the growing dominance of mobile services because of its much lower tariff for local calls than mobile services. The digital fixed line network is being slowly expanded to other areas and, if done in a cost-effective manner, will also add strength to MT to combat competitive threats from mobile services. MT does, however, need a restructuring of its tariffs, with an increase in the local call rate to cover its costs and subsequent periodic revisions of tariffs in line with cost increases. MT wants to acquire a mobile telephone license to aid its survival and growth. This would certainly be helpful in both regards, but proper tariff setting would still be required for the sustainability of the fixed line business.

49. The digital equipment provided under the Project and subsequently is of good quality. MT has been carrying out appropriate maintenance and has the financial and technical capacity and appropriate commercial orientation to continue to do so.

### **IV. ACHIEVEMENT OF OTHER DEVELOPMENT IMPACTS**

#### **A. Socioeconomic Impact**

50. Before the Project, the poor state of the telephone system meant that a significant amount of communication involved the use of messengers and face-to-face contact. Messengers and other direct means of communication are relatively expensive compared with telephone communication, particularly when large distances are involved. Anecdotal evidence from individual households and businesses indicates that because of the Project, telephone use has become easier and more reliable and has permitted the replacement of some of the expensive forms of communication with telephone use. Moreover, the ease of use, reliability, relative cheapness, and increased capabilities of the telephone system have enabled telephone users to increase their communication. The latter has generated benefits in terms of both business and social welfare. While acknowledging the benefits, households, government offices, and businesses cannot quantify the communication savings involved or, in the case of businesses and service providers, quantify the extent to which improved telecommunications have affected the volume or cost-effectiveness of their operations.

51. Most of the increased telephone use has been for voice telephony, but other uses, such as for Internet-based services and credit card charging systems, have started. These new uses represent an increase in domestic service activity and a start on the path toward reduced transaction costs, important for a landlocked country. The large number of information and telecommunications companies now in existence, 140 businesses as of 2003, is one indication of the Project's impact in this regard.

52. As previously discussed, during 1995–2002, MT contributed around \$79 million to the Government in the form of lease charges for assets used by MT, income taxes, and dividends.

While not all these amounts are incremental and they do not include contributions from the mobile and other information technology and communication companies, they do represent significant annual revenue for government use. In earlier years, these revenues helped the Government overcome revenue shortfalls resulting from the abrupt cessation of Soviet support.

53. Other socioeconomic impacts include the significant and growing employment in the sector, although this is mainly for those with technical skills, and students' and others' increased ability to access information via the Internet. The Project also spawned an assembly plant for solar power units that PTA set up to reduce the cost of the solar power units installed under the Project in remote trunk line repeater stations. Subsequently, PTA's plant has been used to supply units for other repeater stations and for households.

54. The Project did not have any specific pro-poor development goal; rather, its aim was general economic growth. The poor may not be able to afford either fixed line or mobile telephones, but they do have access to telephone services through public telephones (200 of which were funded under the Project) and privately offered public access points.

## **B. Environmental Impact**

55. Under the Project, solar power units were installed on the microwave trunk line repeater stations to help reduce diesel fuel consumption. Only 25 of the planned 43 units were installed because of higher than expected costs. Nevertheless, and even though solar units cannot supply sufficient power during the winter for heating as well as for operating the radio systems, fuel consumption at the repeater stations has decreased by an estimated 160,000 liters per year, with additional decreases in fuel and other resources required for fuel delivery. Subsequently, the Government installed solar panels on other stations. The Project had no negative environmental impacts. Roads and footpaths in urban areas were disturbed by the installation of new and replacement cables, but this is a normal urban event and all disturbed areas were restored. Existing analog repeater stations were used for the digital microwave trunk line.

## **C. Impact on Institutions and Policy**

56. Institutional change was a major aim of the Project and the TAs, and the key achievements have already been described. These include the passage of a telecommunications law, although it still contains weaknesses; the separation of sector functions, including by the creation of an independent regulator; and the opening up of the sector to new private sector entrants. MT was partially privatized, and despite some weakness in decision making caused by it not being fully private, it generally operates in a commercial fashion.

# **V. OVERALL ASSESSMENT**

## **A. Relevance**

57. At the time of appraisal, Mongolia did not have an efficient telecommunications system or a legal and policy framework and institutional arrangement for the sector capable of supporting national development plans. Against such a background, the assistance was extremely relevant to Mongolia's needs and ADB's development priorities. Limiting the investment to the main urban centers was also a cost-effective way of maximizing the country's limited borrowing capacity. While ADB's support in recent years has focused on a narrow range

of sectors and subsectors that does not include telecommunications, this does not detract from the continuing importance of having an efficiently operating sector. In short, the Project and the TAs were, and remain, highly relevant.

## **B. Efficacy**

58. Inefficient telecommunications no longer appear to be a major bottleneck to development within the six towns where the Project's investments were located or for customers with mobile telephones in other areas. The project towns account for a large proportion of the urban population and business activity. The sector is open and dynamic, with many active companies offering a wide range of products and expanding service into new areas. Although the sector may not evolve into the structure envisaged at the time the Project was designed, however that structure develops it will accord with the underlying project concept of being driven by the private sector. Weaknesses still exist in self-financing for fixed line expansion and uncertainty surrounds the important area of regulation, both of which will affect the sector's future development and the further removal of the telecommunications bottleneck for people and businesses outside the specific project target area. Overall, however, the Project and TA achieved their purpose and are deemed to have been highly efficacious.

## **C. Efficiency**

59. The Project's reassessed EIRR indicates an acceptable level of economic efficiency in the use of resources. Some implementation delays occurred, the Telecommunications Law still requires amendment, and an adequate regulatory body has only recently been formed; however, overall project design through to implementation was efficient. A firm vision of what was to be done and continuity on the part of both key government and ADB staff probably contributed to this. The Project and the TAs are rated as efficient.

## **D. Sustainability**

60. MT has lost its dominant position in telephony to the mobile operators and will come under increasing pressure in the future, but with tariff support and in a fair and independently regulated environment MT can prosper, and the dynamic, competitive nature of the sector will be sustained. The Project's physical infrastructure is operating well, and in view of MT's recognition of its importance, there is no reason to expect that it will not be maintained, and MT has the financial capacity to do so. The training, the financial systems provided to MT, and the changes in the sector have been fully incorporated into normal sector and telecommunications operations and are being sustained. While it is too early to assess the performance of the CRC, it has the potential to fulfill its purpose and the sustainability of the assistance is rated as most likely.

## **E. Institutional Development and Other Impacts**

61. Institutional change was a fundamental part of the Project and the TAs, and substantial gains in the opening up of the sector to private enterprise and competition were achieved. A telecommunications law was passed, but contains some weaknesses, and the CRC was formed after much delay, although this did not affect the Project. Although not part of the Project, the Government's parallel decision to split the ownership of the telecommunications assets from their operation presents difficult questions for the future and may have hampered the growth of the fixed line network to areas outside the Project. The Project's impact on the broad economy and on social welfare is indicated only through limited anecdotal comments and cannot be

properly determined. In the absence of better evidence, the achievement under this criterion is rated as significant.

## **F. Overall Project Rating**

62. The Project and its associated TAs are rated as highly successful. The assistance was and remains highly relevant to development needs; it achieved what it intended and did so reasonably efficiently. Most of its achievements are likely to be sustained, and it had significant institutional and other achievements. In just a decade, the sector has been transformed from one dominated by the Government and characterized by obsolescence and inefficiency, to one having a multitude of competitive companies providing a wide range of efficient services, and one in which the Government's required role has been reduced to policy setting and the support of independent regulation.

## **G. Assessment of ADB and Borrower Performance**

63. ADB adequately supported the project with an inception mission, a midterm review, and six other supervisory missions. Staff continuity was a notable feature of ADB's supervision. A staff consultant was fielded to conduct a detailed review of MT's financial position prior to the midterm review. The executing agencies reported ADB's supervision as satisfactory. ADB showed flexibility in adjusting to the significant change introduced by the split of MTC into MT and PTA.

64. The Government was often reluctant to fully embrace all the recommendations put to it by consultants because of perceived social pressures, resulting in weakness in the Telecommunications Law, nonrepresentation of consumer groups on the CRC's board, and the split of telecommunications asset ownership and operation. Nevertheless, the Government was committed to the essential vision of the Project, despite political changes, and made decisions rapidly, such as the decision to partly privatize MT.

# **VI. ISSUES, LESSONS, AND FOLLOW-UP ACTIONS**

## **A. Key Issues for the Future**

65. The most pressing issues in the sector at the moment concern (i) tariff-related issues, including rebalancing and adjusting fixed line tariffs, reviewing interconnection fees, and getting the newly established universal service obligation fund operational; (ii) ownership of the telecommunications assets currently assigned to PTA and the related issue of further privatization of MT; and (iii) other issues, principally regulation, including determining whether the sector's requirements could be combined with those of other sectors under a single regulator, revising the Telecommunications Law in the future and separating postal law from telecommunications law, and updating telecommunications policy for both urban and rural areas. These are not new issues, and the Government is addressing them through working groups and other means. Appendix 11 briefly outlines the key issues.

66. What does not appear to be sufficiently debated is the Government's role in the sector, particularly that of PTA. Originally a company on paper only, formed to be the legal entity for owning the telecommunications assets, currently PTA has a substantial staff engaged in the design and implementation of development projects in the sector. At issue is whether PTA should have this role or whether the design and implementation of telecommunications improvements should be left up to the operators. Government decisions can differ greatly from

those of private operators. For example, whereas the latter may opt for second-hand equipment, which is currently available in good condition and at low prices as a result of the downturn in global telecommunications and information technology industries in recent years, the Government tends not to. The Government also tends to assume a useful life of equipment based on technical capabilities, whereas commercial operators may assume a much shorter life because of probable redundancy before the item is worn out. This latter aspect is reflected in the low depreciation rates embodied in the current lease payments charged to MT. These imply a useful life of 25 years, which is much longer than commercial operators use. All these factors suggest that the Government is neither the best operator nor the best owner of assets, and for it to select items on behalf of commercial operators is inappropriate. A dynamic sector has evolved for telecommunications. Under a regime of fair and open regulation, competition will shape the sector further with benefits to consumers in the form of a wide array of well-priced services. Significant involvement by the Government is not needed. The Government's role should be to guide by establishing laws and policy and supporting independent regulation.

## **B. Lessons Identified**

67. While the Project succeeded, drawing definite cause and effect relationships that explain its success is difficult. However, the Project seems to have benefited from (i) being large relative to the size of the sector; (ii) addressing all the important aspects of the sector in a comprehensive way, including human resource development and the lack of local expertise, laws, institutional structure, and physical infrastructure; (iii) achieving a good balance between supporting MT and introducing competition to MT; (iv) focusing the expensive investment components on the major population centers and an existing network that immediately generated high usage rates; (v) being at the right time when foreign investors were interested in and had the financial wherewithal for investing in MT and in mobile and other systems; (vi) having relatively stable project management and supervision; and (vii) having the Government make decisions relatively quickly.

68. The Government's decision to privatize the fixed line telephone business, albeit partially, has proved to be beneficial. While still constrained in some aspects because of the Government's continued dominance in its ownership, MT does operate commercially as a result of the partial change in ownership. Private sector involvement has not led to problems of monopoly abuse.

69. The opening up of the sector to competition from mobile and other services did not result in the demise or marginalization of the fixed line network. Rather, the opposite is the case as demonstrated by the large amount of interconnection between MT and the major mobile operator. However, the speed by which mobile services have grown demonstrates the potential of such services to quickly establish dominant positions. The large pre-existing customer base, the significant service improvements, and the lower cost of fixed line services are important elements in enabling the fixed line operator to maintain a strong position in the sector.

70. Consistency in policy is required from the Government. In retrospect, the Government's continued investment in the fixed line network was inconsistent with encouraging MT and its foreign partner to make similar substantial investment.

71. In retrospect, the agreement that the Government had with the private investor in MT did not contain a sufficient surety that the private investor would keep to its proposed business plan. Future agreements related to privatizations need to ensure that private investors will provide the capital and managerial support promised at the time.

72. The project experience demonstrates that having laws and a regulator in place at the start of sector development is not absolutely necessary if other circumstances are in place. The latter include a strong and unwavering vision of intended development within the Government, clear policy statements, and a large input of technical assistance covering a broad spectrum of the sector.

### **C. Follow-Up Actions**

73. The Government appears to be aware of the major issues in the sector and has processes under way to address them. No new issues need to be raised with the Government. International agencies could assist by periodically reviewing progress and by providing support, for example, through technical assistance if and where necessary. Given the World Bank's current interest in privatization, regulation, and tariff matters, for that agency to take responsibility for such review would appear to be appropriate. The Government of Japan also has an ongoing interest in the sector through its funding of studies in rural telecommunications.

## MAJOR PHYSICAL ACHIEVEMENTS

Item	Appraisal Target	Actual
<b>Telephone Exchange Lines</b>		
Ulaanbaatar	7,000	9,824
Darhan	5,000	5,096
Erdenet	4,000	4,592
Sukhbaatar	<sup>a</sup>	1,384
Bulgan	<sup>a</sup>	1,384
Avaikheer	<sup>a</sup>	1,760
<b>Total</b>	<b>16,000</b>	<b>24,040</b>
<b>Outside Plant Lines<sup>b</sup></b>		
Ulaanbaatar	35,000	66,000
Darhan	7,500	9,100
Erdenet	6,000	10,400
<b>Total</b>	<b>48,500</b>	<b>85,500</b>
<b>Trunk Lines (km)</b>	342 in total, including: Ulaanbaatar-Darhan 180 Ulaanbaatar-Erdenet 162	898 in total, including: Ulaanbaatar-Dashinchilen 225 Dashinchilen-Darhan-Sukhbaatar 275 Dashinchilen-Bulgan-Erdenet 162 Dashinchilen-Avaikheer 236
<b>Solar Power Units</b>	<b>43</b>	<b>25</b>
<b>Public Telephones</b>		
Ulaanbaatar	300	170
Darhan	50	14
Erdenet	50	16
<b>Total</b>	<b>400</b>	<b>200</b>

<sup>a</sup> Not included at appraisal.<sup>b</sup> One line = one cable pair.Source: Asian Development Bank. 2001. *Project Completion Report of the Telecommunications Project in Mongolia*. Manila; Mongolian Telec

**PROJECT COST**  
(\$ million)

Item	Appraisal			Actual		
	Foreign Exchange	Local Currency	Total	Foreign Exchange	Local Currency	Total
<b>A. Base Costs</b>						
1. Telephone Exchange Lines	5.32	0.28	5.60	5.46	0.09	5.55
2. Outside Plant Lines	11.85	5.09	16.94	19.59	4.23	23.82
3. Regional Trunk Transmission	5.56	0.56	6.12	7.04	0.03	7.07
4. Transmission Power Supplies	2.37	0.24	2.61	2.30	0.14	2.44
5. Public Telephone Call Offices	0.22	0.02	0.24	0.39	0.00	0.39
6. Accounting and Management Information System Computer and Software	0.35	0.04	0.39	0.14	0.00	0.14
7. Emergency Maintenance Spares and Equipment	0.24	0.00	0.24	0.20	0.00	0.20
8. Exchange Buildings, Civil Works, and Land	0.00	0.25	0.25	0.00	1.40	1.40
9. Laboratory Equipment	0.00	0.00	0.00	0.09	0.00	0.09
10. Corporate and Human Resource Plans for Mongolian Telecom	0.42	0.02	0.44	0.43	0.00	0.43
11. Human Resource Development	0.18	0.02	0.20	1.26	0.00	1.26
12. Project Design and Management	2.75	0.14	2.89	2.41	0.02	2.43
13. Staff Training of Trainers	1.05	0.11	1.16	0.50	0.00	0.50
14. Design of Telephone Exchange Lines	0.00	0.00	0.00	0.32	0.00	0.32
<b>Subtotal (A)</b>	<b>30.31</b>	<b>6.77</b>	<b>37.08</b>	<b>40.14</b>	<b>5.91</b>	<b>46.05</b>
<b>B. Contingencies</b>						
1. Physical	2.39	0.67	3.06	0.00	0.00	0.00
2. Price	3.14	0.72	3.86	0.00	0.00	0.00
<b>Subtotal (B)</b>	<b>5.53</b>	<b>1.39</b>	<b>6.92</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>C. Service Charges During Construction and Other Charges</b>						
1. Asian Development Bank Loan	0.36	2.32	2.68	0.35	2.17	2.52
2. Other Loans	0.27	1.65	1.92	0.51	0.00	0.51
<b>Subtotal (C)</b>	<b>0.63</b>	<b>3.97</b>	<b>4.60</b>	<b>0.86</b>	<b>2.17</b>	<b>3.03</b>
<b>Total</b>	<b>36.47</b>	<b>12.13</b>	<b>48.60</b>	<b>41.00</b>	<b>8.08</b>	<b>49.08</b>

Source: Asian Development Bank. 2001. *Project Completion Report on the Telecommunications Project in Mongolia*. Manila.

**ACTUAL FINANCING**  
(\$ million)

Components	ADB			KfW			Nordic Group			MT			Total		
	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total
Telephone Exchange Lines	0.00	0.00	0.00	5.46	0.00	5.46	0.00	0.00	0.00	0.00	0.09	0.09	5.46	0.09	5.55
Outside Plant Lines	19.59	1.40	21.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.83	2.83	19.59	4.23	23.83
Regional Trunk Transmission	0.00	0.00	0.00	0.00	0.00	0.00	7.04	0.00	7.04	0.00	0.03	0.03	7.04	0.03	7.07
Transmission Power Supplies	0.00	0.00	0.00	0.00	0.00	0.00	2.30	0.00	2.30	0.00	0.14	0.14	2.30	0.14	2.44
Public Telephone Call Offices	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.39	0.00	0.00	0.00	0.39	0.00	0.39
Accounting and MIS Computer and Software	0.14	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.14
Emergency Maintenance Spare Parts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.20	0.20	0.00	0.20
Exchange Building, Civil Works, and Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.40	1.40	0.00	1.40	1.40
Laboratory Equipment	0.00	0.00	0.00	0.09	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.09
Corporate and Human Resource for MT	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.43	0.00	0.00	0.00	0.43	0.00	0.43
Human Resource Development	0.12	0.00	0.12	1.14	0.00	1.14	0.00	0.00	0.00	0.00	0.00	0.00	1.26	0.00	1.26
Project Design and Management	2.41	0.00	2.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	2.41	0.02	2.43
Staff Training of Trainers	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.50	0.00	0.00	0.00	0.50	0.00	0.50
Design of Telephone Exchange Lines	0.00	0.00	0.00	0.32	0.00	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.32
<b>Subtotal</b>	<b>22.26</b>	<b>1.40</b>	<b>23.66</b>	<b>7.02</b>	<b>0.00</b>	<b>7.02</b>	<b>10.66</b>	<b>0.00</b>	<b>10.66</b>	<b>0.20</b>	<b>4.51</b>	<b>4.71</b>	<b>40.14</b>	<b>5.91</b>	<b>46.05</b>
<b>Services Charges During Construction</b>															
ADB	0.35	0.00	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.17	2.17	0.35	2.17	2.52
Other Loans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.00	0.51	0.51	0.00	0.51
<b>Total Service Charges</b>	<b>0.35</b>	<b>0.00</b>	<b>0.35</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.51</b>	<b>2.17</b>	<b>2.68</b>	<b>0.86</b>	<b>2.17</b>	<b>3.03</b>
<b>Total Project Cost</b>	<b>22.61</b>	<b>1.40</b>	<b>24.01</b>	<b>7.02</b>	<b>0.00</b>	<b>7.02</b>	<b>10.66</b>	<b>0.00</b>	<b>10.66</b>	<b>0.71</b>	<b>6.68</b>	<b>7.39</b>	<b>41.00</b>	<b>8.08</b>	<b>49.08</b>
<b>Financing Percentage</b>	<b>49</b>			<b>14</b>			<b>22</b>			<b>15</b>					

ADB = Asian Development Bank, KfW = Kreditanstalt für Wiederaufbau, MIS = management information systems, MT = Mongolian Telecom.

Source: ADB. 2001. *Project Completion Report on the Telecommunications Project in Mongolia*. Manila.

**TELEPHONE SERVICES, 1996–2003**

<b>Item</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
<b>Number of Customers</b>								
MT Fixed Line	82,100	86,800	93,800	104,100	113,000	120,000	126,600	130,000
MRC Fixed Line	3,000	3,000	3,500	3,700	4,000	10,000	11,000	20,000
Mobicom Mobile	900	2,400	5,400	22,600	80,000	190,000	193,000	220,000
Skytel Mobile				10,000	23,000	38,000	45,100	60,000
<b>Total</b>	<b>86,000</b>	<b>92,200</b>	<b>102,700</b>	<b>140,400</b>	<b>220,000</b>	<b>358,000</b>	<b>375,700</b>	<b>430,000</b>
<b>National Population</b>								
(thousands)	2,340	2,370	2,400	2,430	2,460	2,420	2,470	2,520
<b>Telephones Per 100 People</b>	<b>3.7</b>	<b>3.9</b>	<b>4.3</b>	<b>5.8</b>	<b>8.9</b>	<b>14.8</b>	<b>15.2</b>	<b>17.1</b>
of which:								
MT Fixed Lines	3.5	3.7	3.9	4.3	4.6	5.0	5.1	5.2
Other Fixed Lines	0.1	0.1	0.1	0.2	0.2	0.4	0.4	0.8
Mobile	0.0	0.1	0.2	1.3	4.2	9.4	9.6	11.1

MT = Mongolian Telecom, MRC = Mongolian Railways Company.

Source: Number of customers: Communications Regulatory Committee for 1996–2002 and Operations Evaluation Mission estimates for 2003; for population: ADB. 2002. *Asian Development Bank Key Indicators 2002*. Manila for 1996–2002 and Operations Evaluation Mission estimates for 2003.

## TELEPHONE TRAFFIC, MONGOLIAN TELECOM, 1995–2002

Item	1995	1996	1997	1998	1999	2000	2001	2002
<b>Traffic</b> (minutes '000)								
Local	—	—	378,300	456,100	489,900	503,800	495,200	505,000
Long Distance	11,571	12,382	15,073	17,657	20,506	24,502	30,768	41,106
International Outgoing	1,977	2,354	2,822	3,965	3,989	4,615	4,664	4,725
<b>Total</b>	—	—	<b>396,195</b>	<b>477,722</b>	<b>514,395</b>	<b>532,917</b>	<b>530,632</b>	<b>550,831</b>
<b>Traffic Growth</b> (1997 = 100)								
Local	—	—	100	121	130	133	131	133
Long Distance	77	82	100	117	136	163	204	273
International Outgoing	70	83	100	141	141	164	165	167
<b>Total</b>	—	—	<b>100</b>	<b>121</b>	<b>130</b>	<b>135</b>	<b>134</b>	<b>139</b>

— = not available.

Notes: Data for local and long distance traffic include only calls originated by Mongolian Telecom customers and going to Mongolian Telecom customers. Data for international outgoing traffic include calls originated by non-Mongolian Telecom customers but passing through its network and gateway. The recording of local telephone traffic started in 1996.

Source: Mongolian Telecom.

## PERFORMANCE INDICATORS, MONGOLIAN TELECOM, 1997–2002

Item	1997	1998	1999	2000	2001	2002
<b>A. Service Penetration</b> (telephones Per 100 people)						
1. National	3.80	4.20	4.29	4.50	4.60	4.78
2. Rural	0.60	0.60	0.64	0.67	0.67	0.78
3. Project Towns						
a. Ulaanbaatar	8.00	9.00	9.14	9.79	10.00	10.50
b. Darhan	4.00	4.80	5.86	6.10	6.20	6.60
c. Erdenet	5.80	7.00	7.80	7.80	7.80	8.20
d. Sukhbaatar	6.20	6.30	6.92	7.40	7.40	7.40
e. Bulgan	5.80	6.40	6.40	7.20	7.20	7.20
f. Avaikheer	6.40	6.40	7.20	7.40	7.60	7.60
<b>B. Number of Faults Per Customer Per Year</b>						
1. National	—	1.70	1.30	1.00	0.98	0.98
2. Project Towns						
a. Ulaanbaatar	1.70	1.40	1.10	0.80	0.60	0.54
b. Darhan	—	1.60	1.20	1.00	0.80	0.78
c. Erdenet	—	1.60	1.20	1.10	1.00	0.98
d. Sukhbaatar	—	1.70	1.59	1.36	1.00	1.00
e. Bulgan	—	1.68	1.50	1.48	1.20	1.20
f. Avaikheer	—	1.58	1.50	1.45	1.43	1.24
<b>C. Percentage of Faults Cleared Within 24 Hours (%)</b>						
1. National	—	65.00	75.00	85.00	90.00	92.00
2. Project Towns						
a. Ulaanbaatar	53.00	65.00	75.00	80.00	85.00	88.00
b. Darhan	—	75.00	80.00	85.00	87.00	90.00
c. Erdenet	—	78.00	80.00	85.00	88.00	92.00
d. Sukhbaatar	—	60.00	65.00	75.00	85.00	88.00
e. Bulgan	—	62.00	67.00	75.00	76.00	90.00
f. Avaikheer	—	65.00	68.00	76.00	84.00	86.00
<b>D. Call Completion Rate (%)</b>						
1. National	—	48.40	49.00	50.20	53.00	55.00
2. Project Towns	—					
a. Ulaanbaatar	45.00	46.00	50.00	52.00	54.00	55.10
b. Darhan	48.00	48.20	50.00	50.20	51.00	53.00
c. Erdenet	46.00	48.00	50.00	52.00	51.00	55.10
d. Sukhbaatar	—	49.00	53.00	53.50	54.00	54.00
e. Bulgan	—	48.00	48.40	50.00	52.00	52.40
f. Avaikheer	—	—	—	—	—	—

— = not available.

Note: Sukhbaatar, Bulgan, and Avaikheer were provided with digital exchanges but no outside plant.

Source: Mongolian Telecom.

## FINANCIAL STATEMENTS, MONGOLIAN TELECOM, 1995–2002

(MNT million)

Table A7.1: Balance Sheet

Item	1995	1996	1997	1998	1999	2000	2001	2002
<b>A. Assets</b>								
<b>1. Current Assets</b>								
a. Cash	328	398	734	934	1,208	1,311	3,079	1,932
b. Accounts Receivable	2,888	2,548	3,688	3,190	4,522	6,660	6,675	5,584
c. Inventory	703	723	1,172	1,388	1,608	2,459	1,917	1,894
d. Bad Debt Provision	0	0	0	(131)	(192)	(407)	(580)	(568)
e. Short-Term Receivables	0	0	11	0	94	16	10	0
f. Prepayment and Other	2	30	54	13	65	85	197	296
<b>Total Current Assets</b>	<b>3,921</b>	<b>3,700</b>	<b>5,660</b>	<b>5,395</b>	<b>7,305</b>	<b>10,124</b>	<b>11,299</b>	<b>9,139</b>
<b>2. Noncurrent Assets</b>								
a. Fixed Assets	2,086	2,809	3,581	6,819	7,854	10,146	12,774	19,592
b. Accumulated Depreciation	(223)	(428)	(667)	(1,041)	(1,648)	(2,324)	(3,278)	(4,672)
c. Intangible Assets and Investments	34	117	961	1,073	1,249	1,271	1,266	1,266
d. Other	0	0	0	13	13		0	0
<b>Total Noncurrent Assets</b>	<b>1,898</b>	<b>2,498</b>	<b>3,875</b>	<b>6,864</b>	<b>7,468</b>	<b>9,093</b>	<b>10,762</b>	<b>16,186</b>
<b>Total Assets</b>	<b>5,819</b>	<b>6,197</b>	<b>9,535</b>	<b>12,259</b>	<b>14,773</b>	<b>19,217</b>	<b>22,061</b>	<b>25,325</b>
<b>B. Liabilities and Equity</b>								
<b>1. Current Liabilities</b>								
a. Accounts Payable	2,093	1,520	894	1,833	1,459	2,632	3,270	2,385
b. Other Liabilities and Accruals	188	86	62	49	53	72	26	74
c. Tax Payable	471	160	0	10	174	500	114	43
d. Short-Term Debt	20	0	184	206	245	331	55	1305
e. Deferred Revenue	0	100	251	198	427	294	307	283
f. Dividend Payable	0	144	128	207	316	933	343	645
<b>Total Current Liabilities</b>	<b>2,772</b>	<b>2,011</b>	<b>1,521</b>	<b>2,503</b>	<b>2,675</b>	<b>4,762</b>	<b>4,115</b>	<b>4,735</b>
<b>2. Long-Term Liabilities</b>								
a. Borrowings	0	0	625	378	82	0	1047	1766
b. Long-Term Deferred Revenue	0	0	183	161	113	34	0	0
<b>Total Long-Term Liabilities</b>	<b>0</b>	<b>0</b>	<b>809</b>	<b>539</b>	<b>194</b>	<b>34</b>	<b>1047</b>	<b>1766</b>
<b>Total Liabilities</b>	<b>2,772</b>	<b>2,011</b>	<b>2,329</b>	<b>3,042</b>	<b>2,870</b>	<b>4,797</b>	<b>5,162</b>	<b>6,501</b>
<b>C. Equity</b>								
a. Share Capital	2,479	2,479	2,479	2,587	2,587	2,587	2,587	2,587
b. Asset Revaluation Reserve	0	0	0	0	0	0	0	0
c. Retained Earnings	568	1,707	4,726	6,630	9,317	11,833	14,312	16,237
<b>Total Equity</b>	<b>3,047</b>	<b>4,186</b>	<b>7,206</b>	<b>9,217</b>	<b>11,904</b>	<b>14,420</b>	<b>16,899</b>	<b>18,824</b>
<b>Total Liabilities and Equity</b>	<b>5,819</b>	<b>6,197</b>	<b>9,535</b>	<b>12,259</b>	<b>14,773</b>	<b>19,217</b>	<b>22,061</b>	<b>25,325</b>

Source: For 1995–1998: Asian Development Bank. 2001. *Project Completion Report of the Telecommunications Project in Mongolia*. Manila; for 1999–2002: Mongolian Telecom audited accounts.

Table A7.2: Income Statement

Item	1995	1996	1997	1998	1999	2000	2001	2002
<b>A. Telecommunication Operating Accounts</b>								
<b>1. Revenue</b>								
International Calls	3,061	3,794	5,540	5,121	6,086	5,935	5,630	3,831
Long Distance Calls	1,125	1,471	2,174	2,743	3,309	3,666	3,937	4,156
Local Calls <sup>a</sup>	0	323	1,416	2,546	3,013	3,039	3,111	4,103
Telephone Rental Fees	1,457	1,663	2,165	2,339	2,542	2,648	2,735	2,816
Public Telephone <sup>u</sup>	0	0	51	264	223	300	0	0
Calls to Other Services <sup>c</sup>	0	0	0	0	506	1,813	3,956	5,693
Connection Fees from Other Carriers <sup>d</sup>	0	0	600	1,089	1,792	2,206	3,074	2,419
International Settlement (net) <sup>u</sup>	546	1,873	3,770	2,903	4,065	6,077	4,285	2,922
Additional Service	94	1	14	9	16	24	37	96
Telex and Telegraph	191	238	229	152	168	167	135	89
Rental of Lines and Circuits	648	582	881	769	1,118	1,248	1,252	1,774
Service Connection Fees	110	173	365	879	1,020	797	708	907
Other Telecom	162	720	659	813	35	606	539	463
Cable and Broadcast	282	359	417	604	517	499	479	496
Less: Discounts	0	0	0	(521)	(677)	(972)	(462)	(96)
<b>Total</b>	<b>7,677</b>	<b>11,196</b>	<b>18,282</b>	<b>19,710</b>	<b>23,734</b>	<b>28,055</b>	<b>29,416</b>	<b>29,669</b>
<b>B. Expenses</b>								
Interconnection Fees	0	28	63	290	0	0	0	0
License Fees	0	10	15	16	10	21	46	83
Salaries and Wages	1,555	2,547	2,934	3,666	3,945	4,419	5,737	6,686
Lease Payments	964	2,516	3,985	4,918	7,238	7,541	8,527	9,330
Rental of Satellite Segment	127	194	278	554	540	976	1,069	1,032
International Settlements	0	0	0	0	0	0	18	0
Bad Debt Provision	59	48	2	60	65	229	180	60
Other	1,999	2,737	4,271	4,028	4,012	5,232	4,673	4,951
<b>Total</b>	<b>4,705</b>	<b>8,081</b>	<b>11,548</b>	<b>13,533</b>	<b>15,810</b>	<b>18,418</b>	<b>20,251</b>	<b>22,143</b>
Operating Result Before Depreciation	2,972	3,115	6,733	6,178	7,925	9,637	9,165	7,526
Depreciation and Amortization of Intangib	774	0	256	399	649	714	1,054	1,576
Operating Income	2,198	3,115	6,477	5,779	7,276	8,924	8,111	5,950
<b>C. Nonoperating and MiCom<sup>e</sup></b>								
Revenue	0	0	0	203	1,109	1,965	1,080	1,410
Expense	0	0	0	0	821	1,266	1,342	1,262
Nonoperating Result	0	0	0	203	288	700	(262)	148
Income before Interest, Subsidy, and Tax	2,198	3,115	6,477	5,982	7,564	9,623	7,848	6,098
Interest	0	0	23	49	33	41	19	17
Subsidy to Post Company	130	0	0	0	0	0	0	0
Pretax Income	2,068	3,115	6,454	5,932	7,531	9,582	7,830	6,081
Tax	1,108	1,426	2,824	2,986	3,706	4,810	3,744	2,877
Net Income after Tax	959	1,689	3,630	2,947	3,825	4,773	4,086	3,204
Dividends	391	316	611	909	1,122	2,177	1,607	1,279
Retained Income for the Year	568	1,372	3,019	2,037	2,703	2,596	2,479	1,926
Net Receivables (excluding MiCom) <sup>f</sup>	2,888	2,548	3,688	3,190	4,522	6,533	6,537	5,344
Net Receivables as Days of Operating Re	137	83	74	59	70	85	81	66
Receivables of Telephone Customers	713	857	—	—	2,713	3,297	3,341	2,373
Receivables as Days of Billed Revenue <sup>g</sup>	39	38	—	—	56	62	57	37
Working Ratio <sup>h</sup>	49	50	41	44	36	39	40	43
Dividend as % of Net Income	41	19	17	31	29	46	39	40

— = not available.

<sup>a</sup> Local call billing for customers on digital lines started in 1996. Local call billing for customers on analog lines is included in telephone rental.<sup>b</sup> From 2001, revenue recorded and included as local, long distance, or international revenue.<sup>c</sup> Only the portion accruing to Mongolian Telecom (MT) is accounted for. Actual collection from customers is higher.<sup>d</sup> Net balance in MT's favor.<sup>e</sup> MiCom is a fully-owned subsidiary Internet service provider of MT.<sup>f</sup> Total receivables less payables.<sup>g</sup> Billed revenue includes international, long distance, local, telephone rental, calls to other services, additional service, telex and telegraph, rental of lines and circuits, and connection fees.<sup>h</sup> Ratio of operating expenses other than lease payments to operating revenue, that is, the ratio of all operating expenses other than capital and interest charges to operating revenue.Source: For 1995–1998: Asian Development Bank. 2001. *Project Completion Report of the Telecommunications Project in Mongolia*. Manila; for 1999–2002: Mongolian Telecom audited accounts.

**STAFF NUMBERS, MONGOLIAN TELECOM, 1997–2003**

<b>Item</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
Head Office	192	232	115	121	120	111	103
Ulaanbaatar	1,333	1,335	1,386	1,395	1,397	1,269	1,176
Darhan	221	222	212	208	204	197	189
Erdenet	140	155	155	164	163	151	150
Sukhbaatar	125	132	114	118	118	112	109
Bulgan	129	121	115	115	115	110	107
Avaikheer	177	169	163	166	161	159	155
Other Areas	2,477	2,428	2,308	2,269	2,230	2,097	1,971
<b>Total</b>	<b>4,794</b>	<b>4,794</b>	<b>4,568</b>	<b>4,556</b>	<b>4,508</b>	<b>4,206</b>	<b>3,960</b>
<b>No. of Telephone Lines</b>	<b>86,800</b>	<b>93,800</b>	<b>104,100</b>	<b>113,000</b>	<b>120,000</b>	<b>126,600</b>	<b>130,000</b>
<b>No. of Staff per 1,000 Telephone Lines</b>	<b>55</b>	<b>51</b>	<b>44</b>	<b>40</b>	<b>38</b>	<b>33</b>	<b>30</b>

Note: In 1995, Mongolian Telecom had a total staff of 4,889.

Source: Mongolian Telecom.

## ECONOMIC REEVALUATION

### A. General

1. This analysis reevaluates the economic internal rate of return (EIRR) of the project investments in the digital telephone network and in efforts to improve Mongolian Telecom's (MT's) technical and administrative capabilities. The digital network investments comprise the digital exchanges in Ulaanbaatar, Erdenet, Darhan, Sukhbaatar, Bulgan, and Avaikheer, henceforth called the project area; outside plant in Ulaanbaatar, Erdenet, and Darhan; and the digital trunk lines connecting them together. MT's administrative and technical capabilities were improved by investments in computer-related items and through technical assistance. The analysis does not include the small but significant investment in sector development and the resultant growth of mobile telephony and other services.

2. The main benefits from the evaluated investments are those related to fixed line telephone use within the project area. As a result of the new facilities and capabilities, MT has been able to connect new telephone customers and provide improved services to its existing customers. Compared with the situation both before and without the project, calls are easier to make and require less time to complete because of reduced sharing of services, automation of the connection process, and fewer disconnections and other faults. In addition, the Project resulted in a reduction in MT's operating costs through efficiency improvements embodied in the new facilities. The improved facilities also generated other benefits not reflected in changes in telephone use and MT's operating costs. These include the leasing of lines and use of facilities for activities such as broadcasting, the Internet, telegrams and telexes, and in more recent years, the interconnection with mobile and other services.

3. MT's customers outside the project area also benefit from project improvements, as some of their calls utilize the digital trunk lines and switches in Ulaanbaatar. Similarly, improvements in MT's capabilities have resulted in better service and fault clearance in nonproject areas. However, the customers in nonproject areas represent a small proportion of MT's business activity, thus the benefits accruing to nonproject areas would be relatively minor and have not been included in the analysis.

4. The effect on fixed line customers within the project area, reflected in changes in communication, has three elements, namely, (i) reduced cost of the without project levels of telephone traffic, (ii) reduced cost of communication resulting from the replacement of some nontelephone communication by telephone calls, and (iii) extra communication generated by the greater ease of use and increased capabilities of the telephone service. Concerning the first element, before the Project, communication by telephone was difficult and took more time because of faults and disconnections and, at times, resulted in miscommunication and had to be supplemented by other means. This aspect of the before the Project situation is assumed to be continued in the without Project scenario. The improved services reduced the effort and cost involved in the without project level of telephone communication. With regard to the second element, the project improvements allowed some communication that would otherwise have been done by means of messengers or direct face-to-face contact to be replaced by the use of the telephone, thereby saving time and money. The third element represents added communication that would otherwise not have occurred.

5. Project benefits are assumed to start from 1997. The digital switches were installed between October 1996 and April 1997, except in Avaikheer, where switches were installed in October 1997. Before this, the network comprised the partly utilized E10B digital switch in

Ulaanbaatar, the Earth station international gateway, and analog trunk lines connecting to analog local switches in the various towns and settlements. Traffic growth data during the period immediately prior to the Project are limited (Appendix 5), but these data, coupled with a consideration of the probable impact of the E10B switch in Ulaanbaatar, suggest that without the Project the 1996 traffic would have grown by 1% per year for local calls, 3% per year for long distance calls, and 1% to 3% per year for international calls. These growth rates are low because the analog system was old and was being maintained at its existing capacity with difficulty, with most growth being due to the E10B switch. The main problem with the existing system was that, apart from the E10B switch, the equipment was Soviet built and spare parts were no longer procurable. Table A9.1 presents telephone traffic information. Note that as pointed out in the previous paragraph, project benefits also occur for the without Project levels of telephone traffic. In addition, the recorded local traffic as shown in Appendix 5 and Table A9.1 is only that which passes through a digital switch, which up to 2001 consisted of the E10B and those switches installed under the Project. Local traffic passing through the analog network is not recorded and is billed as telephone rental.

6. The quantification of the main benefits, i.e., those described in para. 4, follows methodologies similar to those used in the project completion report (PCR). Two methods are used. In the first case, the amounts billed to customers, including value-added taxes, are used to value all three of the main benefits described in para. 4. The second of these, i.e., the replacement of nontelephone communication by telephone use, was not separately evaluated by adopting opportunity values for net resources saved; rather, for the sake of simplicity, and because the opportunity values are not expected to be substantial as most messengers would be unskilled workers, the additional telephone traffic representing this category of benefits was included and valued as part of the incremental telephone traffic. As well as being similar to the PCR methodology, this method also parallels the appraisal methodology. In the second case, economic valuation factors are applied to the billed amounts to adjust for a higher value of nonincremental traffic benefits compared with incremental traffic benefits.<sup>1</sup> Thus, the Project's main benefits were quantified by the following: (i) financial revenue streams for the total traffic (both with and without project traffic) applicable to the project area based on prevailing tariffs were calculated from MT's financial statements for 1997–2000; (ii) for the second case, economic valuation factors of 1.3 for residential traffic and 1.2 for business and government traffic were applied to the revenue streams, with 39% of the project area traffic assumed to be from residential telephones and the balance from businesses and government offices; (iii) based on MT's records, 100% of local (timed) traffic, 80% of long distance traffic, and 97% of international traffic from 1997–2000 was assumed to come from the project area; and (iv) to exclude the effects of nonproject investment, after 2000, growth rates of 1% per year for local and international traffic and 3% per year for long distance traffic were assumed for the revenues from the project area.

7. The benefits from incremental use of MT's facilities for activities such as broadcasting, the Internet, telegrams, telexes, and interconnection with mobile and other services were estimated on the basis of MT's incremental revenues for these activities over levels reported for 1996. Data were obtained from MT's financial statements. Similarly, the benefits from improved operational efficiency were also derived from MT's financial statements by comparing operational costs with 1996 levels. While efficiency has improved, not all costs have decreased,

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<sup>1</sup> For a discussion of economic valuation factors see Asian Development Bank. 1997. *Guidelines for Economic Analysis of Telecommunications Projects*. Manila. Even though many problems are associated with this methodology, including its use without extensive consumer research, it has been used here to provide a parallel to the PCR approach.

because total services have increased. MT's operating expenses have increased in the area of salaries and wages with the transition from a large workforce dominated by relatively unskilled staff to one that is slightly smaller, but has more highly skilled staff. In contrast, material and other operating expenses appear to have declined, including from fuel savings as a result of the installation of solar power units at the trunk line repeater stations. The latter savings have been calculated as equivalent to \$100,000 per year based on 2002/03 data supplied by MT for 22 of the 23 stations supplied with solar power units, and have been included in the calculation of net operating expenses.

8. The analysis is done in constant 2001 prices, adopts the domestic numeraire, and expresses values in local currency. A shadow exchange rate factor of 1.14 was used to convert border prices of imported capital items, international settlement income, and other identifiable tradable goods to domestic values. The project investments occurred during 1994–2000 and the analysis period extends to 2020. The calculations assumed that all investments would have a zero residual value.

9. Benefits and costs were computed by first adjusting all relevant financial data to 2001 values before computing incremental amounts. MT's labor costs and general expenses were adjusted to 2001 values using the consumer price index for Mongolia, while other items were adjusted using the implicit gross domestic product deflator. Both indexes were obtained from the Asian Development Bank's key indicators.<sup>2</sup> During the early part of the Project, inflation in Mongolia was high, with a significant effect on labor and general prices, hence the use of the consumer price index, which reflects a higher rate of inflation than the implicit gross domestic product deflator, for labor and general expenses.

## **B. Investment Costs**

10. The investment costs are those of the Project's telephony facilities, i.e., the digital switches, outside plant, trunk lines, and solar power units; the project cost of consultants and equipment for improving MT's operations; the nonproject-funded 1997 expansion of the E10B switch in Ulaanbaatar (\$4.7 million); actual investment by MT up to 2002; and amounts of \$1 million per year from the Government from 1996 to 2002.

## **C. Result**

11. The reestimated EIRR is 26% for case 1, i.e., with benefits based only on the amounts billed (Table A9.2), and 30% for case 2, i.e., with the additional use of economic valuation factors to value the benefits (Table A9.3). The use of only revenues to evaluate the main benefits in case 1, therefore, excludes some consumer benefits, and the result is underestimated. The results can be compared with the estimates of 20.7% and 26.3%, respectively, for the equivalent of cases 1 and 2 in the PCR, and 18.5% for the equivalent of case 1 at the time of appraisal.

## **D. Major Differences from the Project Completion Report and Appraisal Analyses**

12. The PCR provided two analyses. The first analysis used MT's financial revenues to value benefits and took as project benefits up to 2000 all timed local call revenues; 50% of all long distance and international call revenues; and all revenues from rental, connection fees, and public payphones, but did not include international settlement income and fees from

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<sup>2</sup> Asian Development Bank. 2002. *Asian Development Bank Key Indicators 2002*. Manila.

interconnection with other communication services. After 2000, growth factors of up to 4% per year were applied to the benefit streams. Incremental operating costs were assumed to be 1% of capital costs, and were assumed to reflect savings in fuel brought about by the use of solar power units at trunk line repeater stations and efficiency improvements. This analysis produced an EIRR of 20.7%. The PCR's second analysis calculated incremental revenues in the same manner as used in the first analysis, but adjusted these to reflect replacement and incremental traffic by applying economic valuation factors of 1.3 for residential customers, who accounted for 39% of MT's traffic, and 1.2 for the remainder, which were business and government customers. The EIRR for this approach was 26.3%.

13. The appraisal analysis calculated incremental revenues based primarily on assumptions about numbers of incremental customers, numbers of calls per customer, and tariff rates. The analysis also included as project benefits a quarter of the revenues from the preproject digital line customers of the E10B switch (because of increased calls arising from the ability to call a larger number of destinations) and all the revenues from the unused capacity of the E10B switch made operational by the Project. Incremental costs were based on the prevailing average operating cost per line at the time and, therefore, did not provide for any benefit from productivity improvement. A benefit for fuel savings as a result of installing solar power units was assumed.

**Table A9.1: Telephone Traffic ('000 minutes), 1995–2020**

Item	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020
<b>Total Traffic</b>														
Local	293,800	302,600	378,300	456,100	489,900	503,800	495,200	505,000	515,100	525,402	530,656	557,725	586,175	616,076
Long Distance	11,571	12,382	15,073	17,657	20,506	24,502	30,768	41,106	43,161	45,319	47,585	55,164	63,950	74,136
International Outgoing	1,977	2,354	2,822	3,965	3,989	4,615	4,664	4,725	4,772	4,820	4,868	5,116	5,377	5,651
<b>Without-Project Traffic</b>														
Local	293,800	302,600	305,626	308,682	311,769	314,887	318,036	321,216	324,428	327,672	330,949	347,831	365,574	384,222
Long Distance	11,571	12,382	12,753	13,136	13,530	13,936	14,354	14,785	15,228	15,685	16,156	18,729	21,712	25,170
International Outgoing	1,977	2,354	2,425	2,473	2,498	2,523	2,548	2,574	2,599	2,625	2,652	2,787	2,929	3,078
<b>Nonproject Increases in Traffic</b>														
Local	0	0	0	0	0	0	1,000	3,180	8,262	13,496	13,631	14,326	15,057	15,825
Long Distance	0	0	0	0	0	0	2,450	9,846	10,535	11,167	11,837	13,722	15,908	18,442
International Outgoing	0	0	0	0	0	0	5	9	10	10	10	10	11	12
<b>Increased Traffic Due to Project<sup>a</sup></b>														
Local	0	0	72,674	147,418	178,131	188,913	176,164	180,604	182,410	184,234	186,076	195,568	205,544	216,029
Long Distance	0	0	2,320	4,521	6,976	10,566	13,964	16,475	17,398	18,467	19,592	22,713	26,330	30,524
International Outgoing	0	0	397	1,492	1,491	2,092	2,111	2,142	2,163	2,185	2,207	2,319	2,437	2,561
<b>Traffic Benefited by the Project<sup>b</sup></b>														
Local	0	0	378,300	456,100	489,900	503,800	494,200	501,820	506,838	511,906	517,025	543,399	571,118	600,251
Long Distance	0	0	12,522	15,030	17,800	21,715	25,447	28,303	29,580	31,015	32,517	37,696	43,700	50,660
International Outgoing	0	0	2,749	3,891	3,914	4,539	4,583	4,638	4,684	4,732	4,779	5,022	5,278	5,547

<sup>a</sup> This comprises both traffic that replaces other forms of communication and extra traffic.

<sup>b</sup> This comprises without-project traffic within the project area and increased traffic due to the Project.

Source: Mongolian Telecom; Operations Evaluation Mission estimates.

**Table A9.2: Economic Internal Rate of Return Cash Flows**  
**Case 1 (MNT million), 1994–2020**

Year	Capital Expenses				Incremental		
	Project	Government Other	Mongolian Telecom	Total	Operating Expenses	Incremental Benefits	Net Benefits
1994	868	0	0	868	0	0	(868)
1995	1,125	0	3,375	4,500	0	0	(4,500)
1996	35,566	0	1,019	36,585	0	0	(36,585)
1997	12,972	5,053	877	18,903	(52)	13,748	(5,103)
1998	5,539	0	3,888	9,426	643	16,237	6,168
1999	196	0	1,132	1,328	(61)	19,776	18,510
2000	37	0	2,911	2,947	1,039	21,885	17,899
2001	0	1,826	3,639	5,465	593	20,654	14,596
2002	0	1,826	5,989	7,815	956	18,185	9,413
2003	0	1,826	0	1,826	1,194	20,266	17,246
2004	0	1,826	0	1,826	1,156	22,057	19,075
2005	0	1,826	0	1,826	1,121	23,306	20,359
2006	0	1,826	0	1,826	1,136	23,735	20,773
2007	0	1,826	0	1,826	1,151	24,181	21,204
2008	0	1,826	0	1,826	1,166	24,644	21,652
2009	0	1,826	0	1,826	1,181	25,126	22,118
2010	0	1,826	0	1,826	1,196	25,626	22,604
2011	0	1,826	0	1,826	1,212	25,995	22,957
2012	0	1,826	0	1,826	1,227	26,377	23,324
2013	0	1,826	0	1,826	1,243	26,773	23,704
2014	0	1,826	0	1,826	1,258	27,183	24,098
2015	0	1,826	0	1,826	1,274	27,608	24,507
2016	0	1,826	0	1,826	1,290	28,048	24,932
2017	0	1,826	0	1,826	1,306	28,505	25,373
2018	0	1,826	0	1,826	1,322	28,978	25,830
2019	0	1,826	0	1,826	1,338	29,469	26,305
2020	0	1,826	0	1,826	1,354	29,979	26,798
<b>EIRR</b>							<b>26%</b>

EIRR = economic internal rate of return.

Source: Operations Evaluation Mission estimates.

**Table A9.3: Economic Internal Rate of Return Cash Flows**  
**Case 2 (MNT million), 1994–2020**

Year	Capital Expense				Incremental		
	Project	Government Other	Mongolian Telecom	Total	Operating Expense	Incremental Benefits	Net Benefits
1994	868	0	0	868	0	0	(868)
1995	1,125	0	3,375	4,500	0	0	(4,500)
1996	35,566	0	1,019	36,585	0	0	(36,585)
1997	12,972	5,053	877	18,903	(52)	16,260	(2,591)
1998	5,539	0	3,888	9,426	643	19,253	9,184
1999	196	0	1,132	1,328	(61)	23,050	21,784
2000	37	0	2,911	2,947	1,039	24,934	20,948
2001	0	1,826	3,639	5,465	593	23,426	17,368
2002	0	1,826	5,989	7,815	956	20,427	11,656
2003	0	1,826	0	1,826	1,194	22,545	19,525
2004	0	1,826	0	1,826	1,156	24,373	21,391
2005	0	1,826	0	1,826	1,121	25,660	22,713
2006	0	1,826	0	1,826	1,136	26,128	23,166
2007	0	1,826	0	1,826	1,151	26,614	23,637
2008	0	1,826	0	1,826	1,166	27,118	24,126
2009	0	1,826	0	1,826	1,181	27,641	24,634
2010	0	1,826	0	1,826	1,196	28,184	25,161
2011	0	1,826	0	1,826	1,212	28,596	25,558
2012	0	1,826	0	1,826	1,227	29,022	25,969
2013	0	1,826	0	1,826	1,243	29,463	26,395
2014	0	1,826	0	1,826	1,258	29,920	26,835
2015	0	1,826	0	1,826	1,274	30,392	27,292
2016	0	1,826	0	1,826	1,290	30,881	27,765
2017	0	1,826	0	1,826	1,306	31,387	28,255
2018	0	1,826	0	1,826	1,322	31,912	28,764
2019	0	1,826	0	1,826	1,338	32,455	29,290
2020	0	1,826	0	1,826	1,354	33,017	29,837

**EIRR****30%**

EIRR = economic internal rate of return.

Source: Operations Evaluation Mission estimates.

## FINANCIAL REEVALUATION

1. The analysis is done from the perspective of a combined Mongolian Telecom (MT) as operator of the assets and Post and Telecommunications Authority as owner of the assets. The analysis calculates the financial internal rate of return (FIRR) of the cost and revenue streams over 1994–2020. All costs and revenues are expressed in constant 2001 values. The main incremental income, i.e., from increased international, long distance, and local calls, is calculated from incremental call times (Appendix 9, Table A9.1) valued by the average tariff achieved by MT in each year adjusted to a 2001 price basis. Other revenues and operating costs are derived from MT's financial statements as outlined for the economic analysis (Appendix 9).
2. Two results are presented, the first where income taxes are excluded and the second where income taxes on incremental revenues are included. The results are 18% and 10%, respectively (see Table below). An increase in local call tariffs from MNT7/minute to MNT9/minute in either 2002 or 2004 would not appreciably increase the pretax result, which remains at 18%, but would increase the after tax result to 11%. An increase in the tariff to MNT14/minute in 2004 would increase the pretax result to 19% and the after tax result to 11%.
3. The project completion report (PCR) analysis calculated the FIRR on an after tax basis. The result was 12.6%, higher than the operations evaluation result. The PCR analysis differed from the operations evaluation analysis in how incremental revenues and costs were calculated. The PCR's approach, which adopted a percentage of the capital cost as the operating cost, is thought to underestimate incremental operating expenses, which would explain the higher result.
4. The appraisal analysis produced a result of 10.2% based on an after tax analysis. For its financial analysis, the appraisal also adopted the same model and assumptions as used for its economic analysis, which were described in Appendix 9. The tax rate was 25% compared with the rate of 40% used in both the PCR and the operations evaluation analyses.

### Financial Internal Rate of Return Recalculation (MNT million), 1994–2020

Year	Capital Expenses				Operating Expenses	Revenue	Net Cash Flow		Income Tax	Net Cash Flow After Tax
	Project	Government Other	MT	Total			Before Tax			
1994	776	0	0	776	0	0	(776)	0		(776)
1995	1,006	0	2,912	3,918	0	0	(3,918)	0		(3,918)
1996	31,795	0	879	32,675	0	0	(32,675)	0		(32,675)
1997	11,597	4,556	757	16,910	22	4,740	(12,192)	1,887		(14,079)
1998	4,951	0	3,354	8,306	577	8,015	(868)	2,975		(3,843)
1999	175	0	977	1,152	(157)	11,172	10,178	4,532		5,646
2000	33	0	2,511	2,544	971	14,532	11,017	5,424		5,593
2001	0	1,098	3,140	4,238	409	14,348	9,701	5,576		4,126
2002	0	1,098	5,168	6,265	787	13,183	6,131	4,958		1,172
2003	0	1,098	0	1,098	1,034	15,117	12,986	5,633		7,352
2004	0	1,098	0	1,098	1,005	16,744	14,642	6,296		8,346
2005	0	1,098	0	1,098	978	17,887	15,811	6,763		9,047
2006	0	1,098	0	1,098	996	18,239	16,146	6,897		9,248
2007	0	1,098	0	1,098	1,013	18,606	16,495	7,037		9,458
2008	0	1,098	0	1,098	1,031	18,990	16,861	7,184		9,678
2009	0	1,098	0	1,098	1,048	19,389	17,243	7,336		9,907
2010	0	1,098	0	1,098	1,066	19,806	17,642	7,496		10,146
2011	0	1,098	0	1,098	1,084	20,089	17,908	7,602		10,306
2012	0	1,098	0	1,098	1,102	20,384	18,184	7,713		10,471
2013	0	1,098	0	1,098	1,120	20,691	18,473	7,828		10,645
2014	0	1,098	0	1,098	1,138	21,010	18,774	7,949		10,825
2015	0	1,098	0	1,098	1,157	21,342	19,088	8,074		11,014
2016	0	1,098	0	1,098	1,175	21,688	19,415	8,205		11,210
2017	0	1,098	0	1,098	1,194	22,048	19,757	8,342		11,415
2018	0	1,098	0	1,098	1,212	22,423	20,113	8,484		11,629
2019	0	1,098	0	1,098	1,231	22,813	20,484	8,633		11,851
2020	0	1,098	0	1,098	1,250	23,219	20,871	8,788		12,084
<b>FIRR</b>							<b>18%</b>			<b>10%</b>
FIRR assuming local tariff rate increased to MNT9/minute from 2004							18%			11%
FIRR assuming local tariff rate increased to MNT14/minute from 2004							19%			11%
FIRR assuming local tariff rate increased to MNT9/minute from 2002							18%			11%

FIRR = financial internal rate of return, MT = Mongolian Telecom.

Source: Operations Evaluation Mission estimates.

## **KEY SECTOR ISSUES**

### **A. Tariffs, Interconnection Fees, and Universal Service Obligation Fund**

1. With the increased competition from mobile and Internet-based services and the decrease in international telephone tariffs in recent years, clearly Mongolian Telecom's (MT's) international call operations can no longer subsidize its local call operations, unlike the situation in the past. A rebalancing of tariffs with an increase in local call charges is required. At \$0.70/minute to \$0.90/minute, international tariffs are still relatively high, and competition is likely to force prices down in the future. MT has calculated that its local call operations cost more than MNT13/minute, whereas the current tariff is MNT7/minute. MT's local call tariffs are substantially below the rates of MNT150/minute to MNT250/minute for mobile telephones, suggesting large scope for increasing rates for fixed line local calls. However, focusing the discussion on a single local tariff disguises the fact that MT's local call operations comprise high traffic areas, such as the digitized urban networks in the towns covered by the Project; small- and low-volume newly digitized areas; and areas that still have analog-based facilities. The unit costs of a local telephone call in each of these areas will differ, with the analog areas having the highest. The question of tariffs is also bound up with the issue of affordability and the Government's desire to have a uniform tariff so as to not penalize people in small, remote settlements where costs are higher. Any tariff increase is unlikely to be sufficient to cover costs in all areas, and a measure of cross-subsidization will result. This in itself is not a problem, but the cross-subsidies should be made transparent.

2. Interconnection fees among the various carriers were set several years ago. Given the many changes in the sector, a review of these rates is warranted.

3. The concept of transparent cross-subsidization between low- and high-cost areas is embodied in the universal service obligation fund (USOF), which is part of the Telecommunications Law. The operations of carriers in low-cost but high-profit areas are supposed to contribute to the USOF, which is then used to subsidize operations in the high-cost areas; however, the USOF has yet to become operational. A major intended use of the USOF is to fund operations in rural areas. The Telecommunications Law describes the USOF's operation, but does not provide guidance on how the levies on profitable operations are to be applied and collected, and entrusts the decision on the use of the funds to the Post and Telecommunications Authority, a nonindependent government entity. The USOF does not have popular support among operators. The drafting of workable guidelines in collaboration with the operators is required.

### **B. Asset Ownership and Mongolian Telecom's Privatization**

4. The splitting of asset ownership from operations avoided the passing of assets with perceived national strategic importance to foreign ownership and control. The latter came about because MT was partly privatized with shares sold to a foreign entity. The current situation is different, as other carriers exist, MT is no longer the dominant carrier, and alternative trunk lines are available over part of the network. The Government is in the process of debating the ownership issue, with the likely outcome being that ownership of the switches and outside plant would be passed to MT with the trunk line remaining with the Government. One positive result of this is that MT would gain full control over most of the assets that it operates and would have a stronger balance sheet to support borrowing.

5. Passing assets over to MT as further equity means that either the current foreign shareholder must also contribute additional equity or be diluted. One sticking point is the value assigned to some of the assets, particularly the older assets. Clearly, a revaluation of the assets is needed and book values may not be appropriate for a commercial situation (which applies to MT) where communication facilities may have a relatively short life because of redundancy, but alternative, low-priced, second-hand items are available. Even after revaluation, the assets are likely to have a value far in excess of MT's current value, requiring a substantial new contribution from the foreign partner or the effective dilution of the foreign partner's shareholding to the point of it becoming a minor participant. Other alternatives are to seek a second major foreign partner or to remake MT into a government-owned corporation. This study does not aim to guide the decisions in any particular direction, but the last option would clearly weaken MT's commercial orientation and competitive drive.

6. In deciding upon the ownership of assets and further privatization of MT, consideration should be given to ensuring that MT is given the ability to prosper in the increasingly competitive world. MT should have sufficient authority to make decisions quickly, the ability to generate funds for capital expansion through appropriate tariffs and efficiency, an appropriate asset structure that gives it security over its business operations, and appropriate shareholders that support the company. MT has already lost the dominant position in telephony to mobile services and does not appear to have the financial resources to convert people on its waiting list to customers, and may lose more potential customers. This is partly due to an unbalanced and/or inappropriate tariff regime to generate funds, and partly due to reluctance on the part of the foreign partner to provide financing, itself a result of the complex situation created by the split of assets and operations, the form of the privatization contract, and the continued investment by the Government. Decision-making is also a problem. All decisions regarding major capital investment to the network must pass through the Government, and subsequently involve the Post and Telecommunications Authority in design and execution, all of which can be slow and may prevent a rapid response to market opportunities and the use of low-priced, second-hand equipment, such as MT's competitors use.

### **C. Regulation**

7. An important task for the future will be fully establishing the regulator as an unbiased and independent entity. The law provides for this, and early indications suggest that the Communications Regulatory Committee will develop in this way. The World Bank has supported the fledgling committee, and the hope is that it will help as needed in the future. Independent regulation is new to Mongolia, and many facets of Government operations may need modification to accommodate the regulator's unique status. The private sector also remains skeptical, and efforts should be made to correct this perception. A useful improvement for the Communications Regulatory Committee would be to increase the representation of consumer groups in place of Government telecommunications sector staff on its governing committee.