

CHAPTER 7 PROJECT IMPLEMENTATION PLAN

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7.1 Guideline

The projected submarine cable system consists of ocean section and land section. Either section alone is without use. In other words, both sections must be completed at the same time. Furthermore, technical requirements for interface of both sections must be guaranteed. Hence the whole system construction on turn key basis.

Employment of qualified consultant is recommended. Purposes are, among other things, system design at reasonable cost, methodical work progress management, and impartial settlement of problems involved.

Furthermore, the highest reliability is required on equipment of submarine cable system, especially, submersible equipment, in comparison with the terrestrial equipment. In order to obtain such reliability, the accurate quality control (QC) should be usually done in manufacturing and installing.

7.2 Project Cost Estimate

Cost of locally produced materials/equipment which can be used in project implementation and locally employed manpower cost, as well as cost of station building construction and required land procurement, is estimated in Rupiah currency.

Project cost estimates by original plan (140 Mbit/s x 2) and alternative plan (280 Mbit/s x 1) are as under. In each plan, investment required in the year 2000 amounts to about ¥400 million.

	2 x 140 Mbit/s (x 10 ⁶)		1 x 280 Mbit/s	
	Foreign Currency Portion (x10 ⁶ Yen)	Local Currency Portion (x10 ⁶ Rp)	Foreign Currency Portion (x10 ⁶ Yen)	Local currency Portion (x10 ⁶ Rp)
I. Materials/Equipment				
(1) Optical fiber submarine cable system	3,718	-	3,400	-
(2) Digital microwave radio system	428	-	600	-
(3) Power supply system	156			
(4) Operation and maintenance equipment	98	-	200	-
Sub-total	4,400	-	4,200	-
2. Work Cost				
(1) Optical fiber submarine cable system	2,014	1,800	1,871	1,800
(2) Microwave radio system	419	370	419	370
(3) Training	60	350	60	350
(4) Station building, land procurement	-	317	-	317
3. Consultant Fee	220	475	220	475
Total	7,140	3,312	6,770	3,312

* In year 2000, 400x10⁶Yen is necessary for the additional MUX.

7.3 Work Schedule

The projected submarine cable system construction is included in PELITA-IV program. Therefore, system service-in should be expected during 1989.

Table 7-1 presents project implementation time schedule. Conditions whereby to bring project implementation to successful conclusion not later than 1989 comprise land procurement and building construction according to schedule. Work schedule shown in Table 7-1 applies to the case wherein work progress suffers delay to the allowable limit.

7.4 Personnel Training

System maintenance and operation personnel training is to be carried out as part of contractor service contract.

7.5 Scope of Work for Contractor

The Contractor of this project is to be responsible for:

- Detailed design of system, equipment, cables, repeaters and materials
- Manufacturing of equipment, cables, repeaters and materials
- Provision of documents such as factory test specifications, installation/laying plans, on-site test specifications, test results, as-installed drawings, laying report, progress reports and instruction handbooks
- Factory testing and quality control equipment, cables, repeaters and materials

- Delivery of equipment, cables, repeaters and materials to sites
- Training of personnel concerned in the contractor's country and in Indonesia
- Installation, laying and tests at sites and commissioning of the system completed

7.6 Scope of Work for PERUMTEL and Consultant

7.6.1 Scope of Work for PERUMTEL

PERUMTEL as the project implementing entities is to responsible for:

- Land procurement for new repeater station of the digital microwave system, and for two terminal stations at cable landing points
- Design and instruction of station buildings, provision of access road, airconditioning facilities and water supply system
- Assistance in custom clearance for Contractor to import the necessary equipment and materials
- Assistance in getting security clearance for Contractor to enter the projected area
- Lending Contrator the tools and testers for system test
- Preparation of data and informations necessary for the project
- Assistant of at least two (2) counterpart engineers
- Witnesss to the factory test by PERUMTEL staff or Consultants

- Witness to the quality control (QC) during manufacturing by PERUMTEL staff or Consultants

7.6.2 Scope of Work for Consultant

Consultant is organized by the well-experienced foreign consultant and the local consultant.

- Preparation of tender documents
- Assistance in evaluation of tender proposals and contract negotiation
- Execution of witness to factory test and quality control of equipment, cables, repeaters and materials
- Preparation of factory test report and issuing of acceptance certificates
- Check and review of documents submitted by the Contractor
- Supervision of installation workmanship and progress
- Execution of witness to acceptance test at sites
- Preparation of final project implementation report
- Witness to the quality control (QC) during manufacturing in stead of PERUMTEL staff, if necessary
- Execution of training PERUMTEL staff at Consultant country and Indonesia for technology transfer

Table 7-1 Project Implementation Time Schedule

Item	1986			1987			1988			1989			1990						
	6	8	10	12	2	4	6	8	10	12	2	4	6	8	10	12	2	4	6
Loan Agreement Conclusion		▼																	
Consultant Employment Contract		▼																	
Detailed Surveys, Tender Specifications Formulation																			
Tender and Tender Evaluation																			
Contractor Contract Conclusion						▼													
Equipment Manufacturing																			
Shipment, Construction/Installation Work										▼									
Acceptance Test																			
Service-in																			
Building Construction (by PERUMTEL)																			

**CHAPTER 8 ECONOMIC AND
FINANCIAL ANALYSIS**

CHAPTER 8 ECONOMIC AND FINANCIAL ANALYSIS

8.1 Purpose

To make sure that Surabaya-Banjarmasin submarine cable system project, this time, is a project aimed at optimum, effective use of resources from national viewpoint, economic analysis is carried out. At the same time, to examine the break-even point of the project from PERUMTEL standpoint, financial analysis is made.

8.1.1 Analysis Methodology

Concerning implementation worthiness of this project, analysis from the angle of macroscopic economy, i.e., from the viewpoint of telecommunications and economic activities comprising analysis of economic structure of the Republic of Indonesia, communication and transportation relationships, and energy consumption in communication services, is worthwhile to describe to some extent. Such analysis, however, can hardly provide a means of substantial decision making by policy planners. Hence no macroscopic project analysis.

This survey is a feasibility study level survey. Therefore, to be made here is quantitative analysis from the angle of microscopic economy for the purpose of assessing benefits to ensure or analysis by estimate to prove into implementation worthiness of this project. That is to say, clarification is made concerning prerequisites for project level investment decision making.

The guideline whereby to determine investment scale and implementation plan for the project is based on the undermentioned two analysis results.

- (1) EIRR: Economic Internal Rate of Return
- (2) FIRR: Financial Internal Rate of Return

8.1.2 Analysis Procedures

The project, this time, is to expand Kalimantan-Jawa communication transmission media by adding the submarine cable to troposcatter microwave link and, by this means, elevate quality and expand quantity of communication transmission to/from Kalimantan, Sulawesi, Halmahera, Maluku and Irian Jaya.

Therefore, fundamental study concerning project implementation effect on future telecommunications system activities of Kalimantan and other related regions is essential.

On the other hand, judging as to whether or not the use of resources in the project constitutes optimum utilization of resources of input property (cost) and beneficiary structure of output (benefit) assumes importance as ultimate objective.

Relationship of all those factors are illustrated in Figure 8-1, however, in the case of communication project, there are aspects which require special consideration. First, problem resides in expressing extremely complicated relationships by a single equation. Second, data used are of different kinds so that correlations observed do not necessarily indicate causality in many cases; hence great difficulty of determining national and regional impacts quantitatively.

This particular project covers just one part of the whole communication system, or, more precisely, is an improvement project for only one section of terrestrial transmission route. It should not be influenced by the economy of scale which is bound to intervene when the whole transmission network including satellite communication system is taken up for coverage. Therefore, this time, only the overland transmission facilities of the projected submarine cable system is taken up as object of evaluation analysis.

Normally the economic evaluation to a certain system is carried out to the original plan and the alternative plan, however, the alternative plan in this case may be an expansion of the troposcatter microwave link. Considering that the performances of the troposcatter microwave system are somewhat obsolete for today's transmission media to transmit diversified kind of signals such as data and TV signals and most of its existing facilities leaves only four years of the system life, it is not appropriate to assume this system as an alternative transmission media. Accordingly the economic evaluation is made only for the submarine cable system and backhaul system.

In view of the foregoing project characteristics, economic and financial evaluation by analysis are to be carried out by means of work flow shown in Figure 8-2.

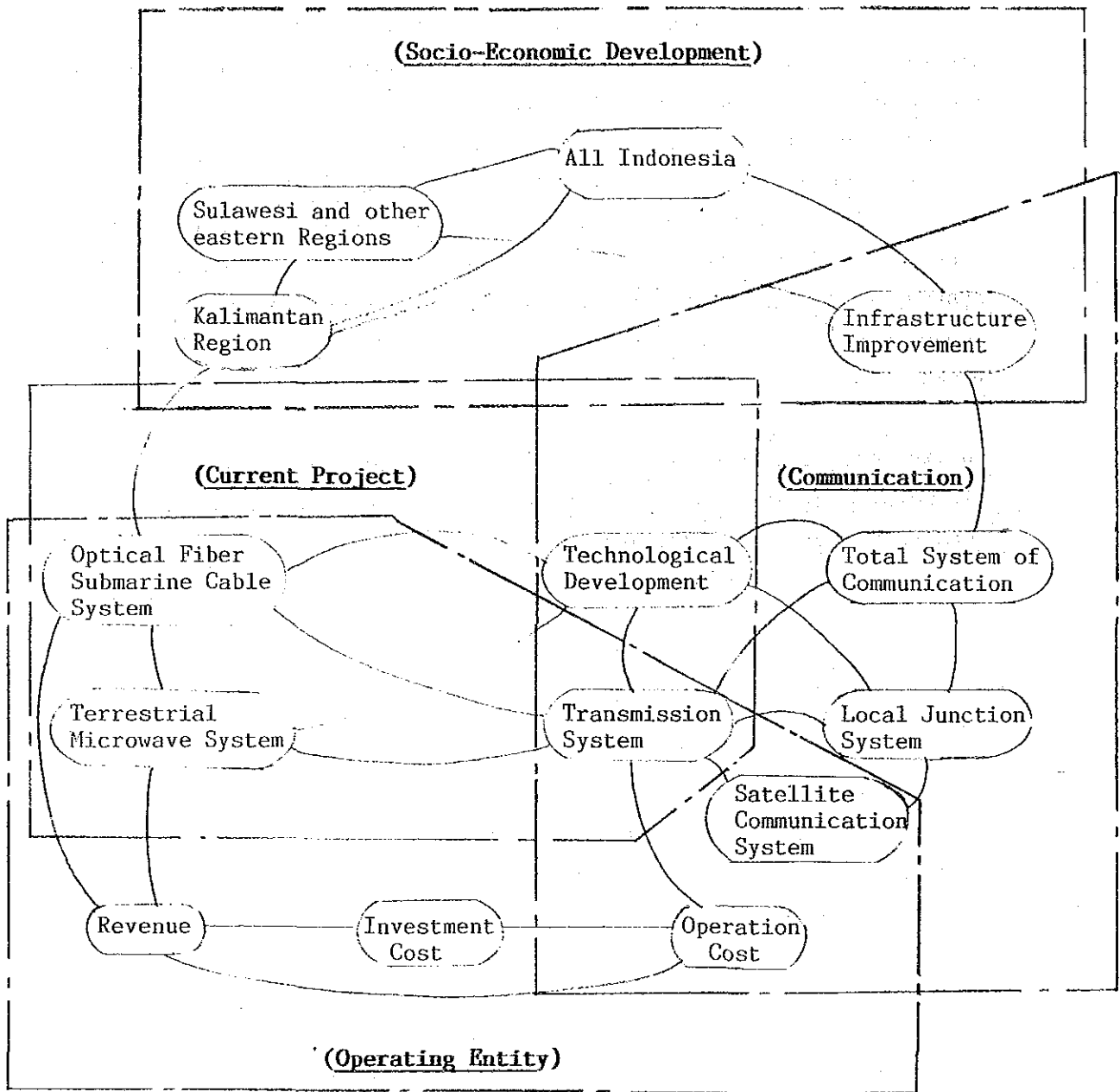


Figure 8-1 Project Identification

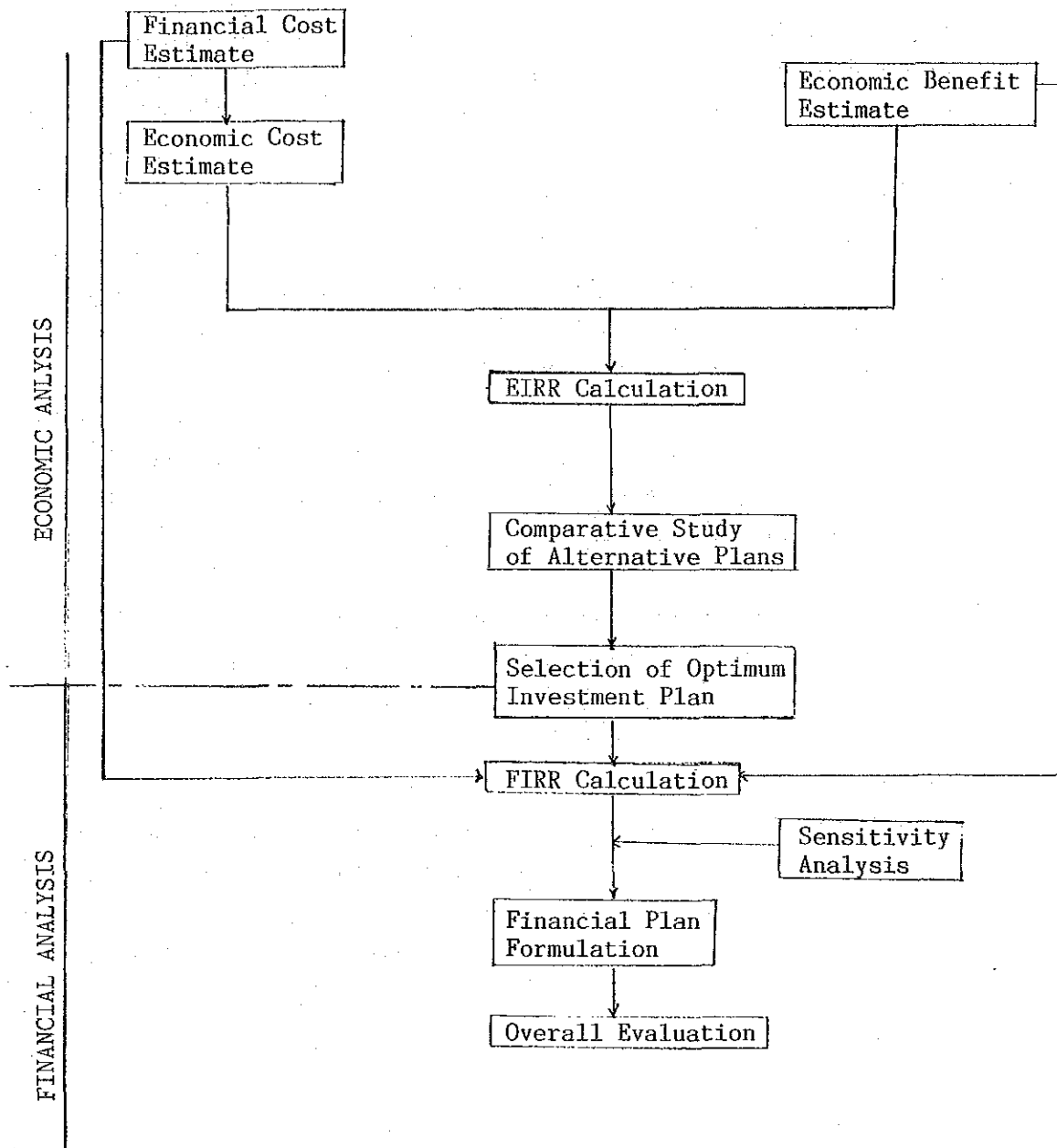


Figure 8-2 Work Flow for Project Evaluation

8.1.3 Scope of Project Evaluation

At present, SLDD communication between Kalimantan, on one hand, and Jawa and other main islands, on the other, is via PALAPA satellite link and troposcatter microwave system.

For evaluation from macroscopic viewpoint concerning significance and effect of this project as toll transmission system, comparison between satellite communication system and terrestrial transmission system is the standard practice. However, the system to be established by this project is a system wherein satellite communication system and terrestrial transmission system coexist, reflecting system engineering requirement and system management policy, so that the preferred system quality cannot be determined by mere economic comparison.

Satellite communication system is not a transmission system to serve the limited area only, but is a means of communication at national level including overseas communication.

Furthermore, the break-even point in terms of distance between satellite communication and terrestrial transmission is about 390 km according to REPELITA-IV. Considering that Surabaya-Banjarmasin coverage by this project extends about 500 km long and main traffic exchange between almost 900 km, Banjarmasin and Jakarta, satellite communication system commands greater economic merits than terrestrial transmission system in respect that only distance.

The project, this time, is to provide submarine cable system as new media in addition to existing troposcatter microwave link between Kalimantan and Jawa. Therefore, project evaluation is for both submarine cable system and its backhaul system. Project scope is up to connection facilities to existing repeater stations on both sides.

Therefore, project evaluation is to be made for both submarine cable system and it's backhaul system. Project scope is to connection facilities to existing repeater stations on both sides.

8.1.4 Establishment of Alternative Plans

For the proposed submarine cable system, alternative plans are two-case as stated in CHAPTER 5, Paragraph 5.1.2. They are 1x 280 Mbit/s system (original plan) and 2x140 Mbit/s system (alternative plan). Comparative study is to be made for these two plans such as Original Plan 2x140 and Alternative Plan 1x280.

For both connection sections to terrestrial microwave system, various alternative plans are conceivable. However, in view of the facts that the ratio of initial investment cost for those sections is low, compared with submarine cable system construction cost, and that for alternative plans, comparison by minimum cost method is possible, therefore combined cost analysis for submarine cable plans and terrestrial microwave transmission system plan is not carried out. Alternative plans are to be evaluated the aforementioned Original Plan 2x140 and Alternative Plan 1x280 combined with terrestrial microwave system selected by minimum cost method.

Based on the foregoing preconditions, itemized cost estimates and analyses are to be conducted in this chapter.

8.2 Financial Cost Estimate

8.2.1 Types of Cost

Required cost data for EIRR calculation in project evaluation, this time, are twofold. They are

- (1) Initial investment cost
- (2) Maintenance and operation cost

(1) Initial investment cost

Whichever the finally chosen alternative plan, construction work period is to be 36 months from September 1986 through August 1989. Cost required at initial stage is to be of investment schedules for Original Plan 2x140 and Alternative Plan 1x280, classified by local and foreign currency portions, are given in Table 8-1 and Table 8-2.

In each plans, cost of equipment procurement from overseas sources assumes large proportion so that foreign versus local currency portion ratio stands at about 9:1. Submarine cable system construction cost occupies about 40% of the whole amount of investment cost. And, foreign versus local currency portion ratio stands at about 5:1.

(2) Maintenance and Operation Cost

Maintenance and operation cost consists of equipment supplies cost and personnel cost. Here, maintenance and operation cost estimates by transmission systems are made. Table 8-3 presents estimated maintenance and operation cost ratios by transmission systems, compared with the corresponding equipment investment ratios.

1) Optical Fiber Submarine Cable System

For maintenance and operation cost in the case of submarine cable system as domestic communication system, experientially proven standard value common to all countries has not yet been established. The projected Surabaya-Banjarmasin submarine cable system as domestic communication system is the first to be realized in Indonesia so that its maintenance and operation cost has only to be estimated, based on the empirical value to maintenance and operation

TABLE 8-1 INVESTMENT PLAN (Original Plan : 2x140)

(UNIT:MILLION Rp.)

DESCRIPTION	1986		1987		1988		1989		2000		2009		2014		TOTAL	
	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL
1. GLASSFIBER SUBMARINE CABLE			2016		25074	1240	4610	820							31700	2060
1.1 MATERIALS			2016		18144										20160	
1.2 INSTALLATION					6930	1240	4610	820							11540	2060
2. DIGITAL MICROWAVE SYSTEM			336	317	4174	200	770	140			5280	340	-3960	-255	6600	742
2.1 MATERIALS			336		3024						3360		-2520		4200	
2.2 INSTALLATION					1150	200	770	140			1920	340	-1440	-255	2400	425
2.3 BUILDING/LAND				317												317
3. DIGITAL MUX			112		1398	70	262	50	448		1772	120	-1441	-90	2551	150
3.1 MATERIALS			112		1008				448		1120		-952		1736	
3.2 INSTALLATION					390	70	262	50			652	120	-489	-90	815	150
4. CONSULTANT	460		215		336	285	221	190							1232	475
4.1 ENGINEERING FEE	460		117												577	
4.2 MANAGEMENT			98		336	285	221	190							655	475
SUBTOTAL	460		2679	317	30982	1795	5863	1200	448		7052	460	-5401	-345	42083	3427
TOTAL		460		2996		32777		7063		448		7512		-5746		45510

TABLE 8-2 INVESTMENT PLAN (Alternative Plan : 1x280)

(UNIT:MILLION Rp.)

DESCRIPTION	1986		1987		1988		1989		2000		2009		2014		TOTAL	
	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL
1. GLASSFIBER SUBMARINE CABLE			1904		23486	1240	4238	820							29628	2060
1.1 MATERIALS			1904		17136										19040	
1.2 INSTALLATION					6350	1240	4238	820							10588	2060
2. DIGITAL MICROWAVE SYSTEM			336	317	4174	200	770	140			5280	340	-3960	-255	6600	742
2.1 MATERIALS			336		3024						3360		-2520		4200	
2.2 INSTALLATION					1150	200	770	140			1920	340	-1440	-255	2400	425
2.3 BUILDING/LAND				317												317
3. DIGITAL MUX			112		1398	70	262	50	448		1772	120	-1441	-90	2551	150
3.1 MATERIALS			112		1008				448		1120		-952		1736	
3.2 INSTALLATION					390	70	262	50			652	120	-489	-90	815	150
4. CONSULTANT	460		215		336	285	221	190							1232	475
4.1 ENGINEERING FEE	460		117												577	
4.2 MANAGEMENT			98		336	285	221	190							655	475
SUBTOTAL	460		2567	317	29394	1795	5491	1200	448		7052	460	-5401	-345	40011	3427
TOTAL		460		2884		31189		6691		448		7512		-5746		43438

cost of international submarine cable system , i.e., 1.5-2.0%. This time, however, total cable line length is short, i.e., about 400 km, so that maintenance and operation cost ratio cannot but be somewhat higher than the corresponding ratio of long distance international submarine cable system whereas manpower cost in Indonesia is considerably lower than in Japan. By these reasons, maintenance and operation cost ratio, this time, is set at 2% of the amount of initial investment.

2) Digital Microwave System and Digital Multiplex Equipment

For digital microwave system and digital multiplex equipment, maintenance and operation cost is estimated at 6% of the amount of initial investment, based on the past empirical data. More precisely, this cost ratio derives from radio equipment system maintenance cost ratio plus system operation manpower cost and power generation cost ratios. In the case of multiplex communication system, additional investment for system expansion shall be scheduled in the year 2000. Although this fact is not bound to increase investment ratio itself because of it to be occupied very small portion compared with total investment cost maintenance and operation cost ratio is to remain unchanged throughout the project life.

Table 8-3 Maintenance and Operation Cost Ratio

	Equipment Investment Ratio	Maintenance, Operation Cost Ratio
Optical Fiber Submarine Cable System	80 %	2%
Digital Microwave System	15 %	6%
Digital Multiplex Equipment	5 %	6%

Table 8-4 Total Financial Cost

	ORIGINAL PLAN (2x140 Mbit/s)			ALTERNATIVE PLAN (1x280 Mbit/s)				
	Foreign	Local	Total	(%)	Foreign	Local	Total	(%)
1. Glassfiber Submarine Cable	31,700	2,060	33,760	51%	29,628	2,060	31,688	51%
1) Materials/Equipment	20,460	-	20,160		19,040	-	19,040	
2) Installation/Construction	11,540	2,060	13,600		10,588	2,060	12,648	
2. Digital Microwave System	6,600	742	7,342	11%	6,600	742	7,342	12%
1) Materials/Equipment	4,200	-	4,200		4,200	-	4,200	
2) Installation/Construction	2,400	425	2,825		2,400	425	2,825	
3) Building/Land	-	317	317		-	317	317	
3. Digital MUX	2,551	150	2,701	66%	2,551	150	2,701	4%
1) Materials/Equipment	1,736	-	1,736	3%	1,736	-	1,736	
2) Installation/Construction	815	150	965		815	150	965	
Sub-Total	40,851	2,952	43,803	66%	38,779	2,952	41,731	67%
4. Consultant	1,232	475	1,707	3%	1,232	475	1,707	3%
1) Engineering Fee	577	-	577		577	-	577	
2) Management	655	475	1,130		655	475	1,130	
Total	42,083	3,427	45,510		40,011	3,427	43,438	
5. Operation/Maintenance	-	-	20,536	31%	-	-	18,562	30%
Grand Total	-	-	66,046	100%	-	-	62,000	100%
Proportion of Currency	92%	8%			92%	8%		
Proportion of Cost		106.5				100		

Note: 1) Exchange Rate: Rp 1,120 = ¥200 = 1US.\$

To simplify calculations, 2.8% is used here for mean maintenance and operation cost ratio proportional to equipment investment ratio.

8.2.2 Total Financial Cost

Total financial cost for each of the aforementioned two alternative plans appears in Table 8-4. Financial cost comparison between two alternative plans is as under.

Alternative Plan 1x280 - Original Plan 2x140
= Rp. 4,046 Millions (US\$ 3.61 Millions)

Original Plan 2x140 cost is about 6.5% higher than Alternative Plan 1x280 cost.

8.3 Economic Cost Estimate

From the financial cost calculated in the preceding section, economic cost estimate is made by the following manner.

8.3.1 Value of Money Estimate

According to Bank Indonesia data, Rupiah exchange rate (middle price) variation against U.S. dollar are as under.

1979	Rp	632.12/US\$	
1980	Rp	633.70/US\$	
1981	Rp	643.05/US\$	
1982	Rp	691.94/US\$	
1983	Rp	994.12/US\$	
1984	Rp	1,028.00/US\$	
1985	Rp	1,107.23/US\$	
1986	Rp	1,120.00/US\$	(as of January)

economic value in a real sense. Therefore, market value used in financial cost calculation is converted to economic cost by specifically calculated standard conversion factor (SCF) described hereinafter.

(1) Standard Conversion Factor (SCF)

The foregoing Rupiah currency value variations against U.S. dollar are the variations under the floating rate system. However, the real Rupiah currency value against U.S. dollar should rather develop out of Indonesia-U.S. competitive relationships in external trade and concomitant export-import tariffs. When calculated from those relationships, the Rupiah's position against U.S. dollar can be evaluated to be 0.9824. Meanwhile, the foreign currency portion of investment cost is quoted in CIF value. Hence no application of SCF.

SCF is obtained by

$$SCF = \frac{Im + Ex}{Im + Tm + Ex - Tx}$$

where;

Im : Annual Import Amount

Tm : Annual Export Amount

Ex : Annual Import Tariff Amount

Tx : Annual Export Tariff Amount

Table 8-5 External Trade Balance and SCF

(Unit: Million U.S. dollars)

	Total Import (Im)	Total Export (Ex)	Import Tariff (Tm)	Export Tariff (Tx)	SCF
1979/80	7,202.3	15,590.1	718.2	615.5	0.9955
1980/81	10,834.4	23,950.4	1,014.8	481.3	0.9849
1981/82	13,272.1	25,164.5	1,181.1	199.7	0.9750
1982/83	16,858.9	22,328.3	1,078.7	118.2	0.9760
1983/84	16,351.8	21,145.9	817.3	104.6	0.9813

Source: Statistic Indonesia 1984

For SCF value, 1979-1984 annual mean is used. This time, SCF = 0.9824 is adopted.

(2) Exchange Rate Establishment

When the Rupiah's exchange rate is estimated from SCF until 1984 by the principle of shadow exchange rate (SER), the exchange rate as of January 1986 (field survey time) turns out to be Rp 1,120/US \$ so that SER becomes Rp 1.140/US\$.

Thus, for conversion to Rupiah of the foreign currency portion which is necessary for economic evaluation of project, this time, the above exchange rate is used. The result obtained is

$$\text{Rp } 1,120 \times \frac{1}{0.9824} = \text{Rp. } 1,140$$

8.3.2 Sunk Cost

In the Project, this time, work in the section from submarine cable landing point to repeater station on both sides is to be financed by entirely new investment. Part of existing facilities at repeater station, such as antenna tower, are to be utilized. Cost of such existing facilities, which was appropriated in the budget to the past project concerned, is not included in the current project cost.

8.3.3 Salvage Value

(1) New Facilities

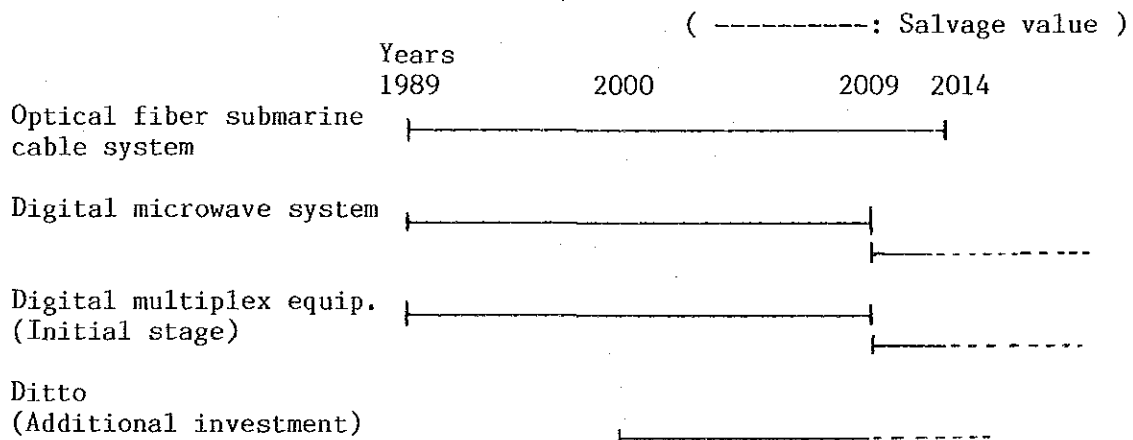
Service life of optical fiber submarine cable system is 25 years whereas overland digital microwave system and digital multiplex equipment service life is 20 years. This difference

Service life of optical fiber submarine cable system is 25 years whereas overland digital microwave system and digital multiplex equipment service life is 20 years. This difference in service life gives rise to necessity to so arrange that salvage value of re-invested equipment cost becomes the same.

For that purpose, re-investment in overland system facilities is made in the 20th year, allowing digital microwave submarine cable system to leave salvage value for 15 more years at the time the service life of submarine cable system terminates. This arrangement is of the same effect as considering salvage value by subtracting equipment cost during those 15 years from the amount of re-investment.

For digital multiplex equipment, additional investment in the 10th year is planned in two alternative schemes so that five years equivalent of equipment salvage value is subtracted from the amount of investment.

By means of those adjustments, two alternative plans, i.e., Original Plan 2x140 and Alternative Plan 1x280 can have project life of 25 years. See the illustration below.



(2) Existing Facilities

When the projected submarine cable system is completed, existing troposcatter facilities are to be used as back-up system in emergency case. For existing facilities, disposal value must be studied however, in this case, it is very difficult to assume how often this troposcatter would be used as back-up system at the present. On the other hand, existing facilities are not to be re-used in another project or as auxiliaries so that net salvage value is set at zero depend on the same idea of sunk cost. In other words, benefit, such as sale of existing facilities after withdrawal, is not taken into consideration.

8.3.4 Total Economic Cost

Economic cost calculation results based on the foregoing preconditions appear in Table 8-6.

Also shown below are total financial and economic costs for each alternative plans. Foreign currency portion required for project implementation, this time, holds big weight. Nevertheless, as market prices reflect effective rates, no substantial difference exists between the two cost estimate.

	Financial Cost	Economic Cost
Original Plan 2x140	Rp. 66 x 10 ⁹	Rp. 66.8 x 10 ⁹
Alternative Plan 1x280	Rp. 62 x 10 ⁹	Rp. 62.7 x 10 ⁹

Table 8-6 Total Economic Cost

	ORIGINAL PLAN (2x140 Mbit/s)		ALTERNATIVE PLAN (1x280 Mbit/s)		Total
	Foreign	Local	Foreign	Local	
1. Glassfiber Submarine Cable	32,268	2,060	34,328	2,060	32,219
1) Materials/Equipment	20,521	-	20,521	-	19,381
2) Installation/Construction	11,747	2,060	13,807	2,060	12,838
2. Digital Microwave System	6,718	742	7,460	742	7,460
1) Materials/Equipment	4,275	-	4,275	-	4,275
2) Installation/Construction	2,443	425	2,868	425	2,868
3) Building/Land	-	317	317	317	317
3. Digital MUX	2,597	150	2,747	150	2,747
1) Materials/Equipment	1,767	-	1,767	-	1,767
2) Installation/Construction	830	150	980	150	980
Sub-Total	41,581	2,952	44,533	2,952	42,424
4. Consultant	1,254	475	1,729	475	1,729
1) Engineering Fee	587	-	587	-	587
2) Management	667	475	1,142	475	1,142
Total	42,837	3,427	46,264	3,427	44,155
5. Operation/Maintenance	20,536		20,536	18,562	18,562
Grand Total	-	-	66,800	-	62,717
Proportion of Cost		106.5		100	

Note: Exchange Rate: Rp 1,140 = ¥ 200 = 1 US.\$

8.4 Benefit Estimate

8.4.1 Objective Benefit

As stated previously, this project consists of feasibility study level survey. Communication service, being specific in nature, cannot be easily substituted with other factors of production. Therefore, estimation is made here for service revenue which is necessary for comparison of opportunity costs of capital at project level by means of microscopic economic analysis.

Service revenue to be generated by expansion of this project takes shape as benefit to telephone, telex, etc., service users, and such benefit is estimated, based on observation result concerning users willingness to pay. However, information as to how the users utilize such service cannot be obtained as much as required so that, for benefit to users from now forward, forecast is made, based on analysis of past data.

In a communication project, direct benefit consists of operating profit from service management as described below. At the same time, consumer's surplus, or, more precisely, willingness to pay among users, is also estimated as far as possible whereby to fix economic benefit quantitatively.

(1) Direct Benefit (Operating Profit)

1) Scope of benefit

Direct benefit arising out of project realization, this time, can be classified as under.

- Telephone service tariff
- Telex service tariff
- Leased circuit service tariff
- Telegram service tariff

2) Indirect Benefit (Consumer's Surplus)

Benefit which users recognize by receiving service is usually greater than benefit measured with revenue accruing to telecommunications business. This especially holds true in such countries where the demand for telecommunications service by far exceeds the supply. The difference between real measured value of the worth which users are willing to pay, i.e., the benefit which users recognize by receiving service, and service tariff actually imposed on users constitutes what is called consumer's surplus, and by adding such consumer's surplus to direct benefit, gross economic benefit to users can be estimated.

Mentioned below are three approaches generally used for partial measurement of consumer's surplus.

- (1) Price change method
- (2) Best alternative method
- (3) Expenditure method

Here, economic revenue estimation is made by means of partial application of price change method though such is only for least estimate of economic value. That is to say, benefit resulting from demand fulfillment rate is to be assumed to be consumer's surplus. In this case, positive demand (unfulfilled subscriber applications) beyond capacity of installation plan, as well as latent demand, is considered to be consumer's surplus, and catering for such consumer's surplus holds not a little to do with PERUMTEL's budget and the Government of Indonesia's telecommunications management policy.

8.4.2 Scope of Benefit

Benefit comparison for different telecommunications service categories, such as long distance service, urban service and rural service, is not easy. Especially so in the case of this project. For, the projected submarine cable system constitutes part of communication system components to be constructed (including local and toll switching equipment and toll trunk circuits).

Futhermore, data collection, be it by personal interviews or by other methods, to know prospective demand trends, usually requires a big volume of work. Thus, for revenue estimate of this project, first, the number of subscribers in the whole of Indonesia is estimated; then, the tariff rate in the coverage area of this project is applied; finally, the rate of revenue distribution to this project is determined.

8.4.3 Revenue Distribution Rate Philosophy

Chief among factors to exert influence on revenue distribution rate are equipment investment amount, transmission facilities condition, technological renovation, calling pattern and tariff revenue.

Following are the steps whereby to estimate revenue distribution to this project:

1) Study in Cost Aspect

Initial step to be taken in case where expanded equipment running cost and capital cost are to be distributed in accordance with the size of their output is to totalize various kinds of costs for each system division and to calculate cost ratio for the system concerned as the general outline. In other words, the amount of benefit proportional to equipment investment cost is assumed to be revenue from newly established project.

Commonly used in communication project is the investigation results of World Bank (Table 8-7) and 16 countries based on CCITT General Network Planning.

Table 8-7 Telephone System Construction Cost Distribution by Components

Item	Ratio (%)
Subscriber's premise equipment	10%
Local subscriber's line	35%
Local switching	25%
Inter-Local exchange trunking	25%
Toll trunking	5%
Toll transmission	15%

According to the table above, transmission facilities occupy 15% share. And toll transmission ratio of CCITT General Network Planning is judged the same with that of world bank, considering 23% of total investment cost is included transferring cost. This ratio, however, presents a guideline only, as is noted in these investigation report. Therefore, using the ratio for reference, analysis is made for transmission facilities division investment ratio in Indonesia.

That is to say, the said investment ratio in Indonesia during 10 years from 1975 to 1984 changes from 7.4% to 39.1%. The 10-year average stands at 22.1%. The investment plan by REPELITA-IV including investment in PALAPA-C program registers 21.7%.

From the foregoing, transmission facilities investment ratio in Indonesia can be safely assumed to occupy about 9-22% share. It comes to the conclusion that transmission facilities investment ratio is assumed 15% herein.

2) Study in Traffic Volume

Generally, for facilities expansion policy, decision is made not only by factors determined for economy as a whole from national angle, but also by comparison between financial return accruing to telecommunications business entity and expenses entailed. Although economic benefit estimate involves not a few difficulties as stated previously, judgement on propriety concerning facilities expansion should be made by the total number of both calling and called parties who actually partake of benefit.

According to the traditional welfare economy theory, when tariff rate is equal to marginal cost that creates service, the market remains balanced, and while the price paid exceeds cost, service supply quantity must continue to be increased. In Indonesia, the tariff system is established, based on telephone installation expenses and also on service cost and worth that increase as the distance between calling and called parties increases.

Automatic toll calls in Indonesia are charged by pulse meter according to service distances.

Transmission facilities cost after satellite link utilization became possible is basically unrelated to transmission distance, and this is a well-known fact. Here, from the earlier estimated (refer to Chapter 3) traffic to proceed via submarine cable system to be established by this project, the percentage which the said submarine cable system will occupy out of all transmission facilities in Indonesia is estimated, and, from such percentage, the rate of revenue distribution to this project is estimated.

The estimated revenue distribution rates of this project by years are as under.

Table 8-8 Estimated Revenue Distribution Rate

(Unit: %)							
Year	1990	1995	2000	2005	2010	2015	(2014)
Terrestrial transmission route traffic rate	12.0	22.1	35.5	50.9	52.8	69.1	(67.3)
Traffic passing rate	3.8	11.0	30.9	40.6	27.9	39.4	(37.7)
Revenue distribution rate	0.6	1.7	4.6	6.1	4.2	5.9	(5.7)

In the table above, top line figures present terrestrial transmission traffic rate compared with total transmission traffic including satellite link. Middle line figures present transmission traffic relating to proceed via projected Surabaya-Bnajarmasin submarine cable system. Bottom line figures indicate ultimate revenue distribution rates of the projected system considering sectorial investment cost ratio.

Fig. 8-3 shows the forecast of changes for these distribution rates in a time-series.

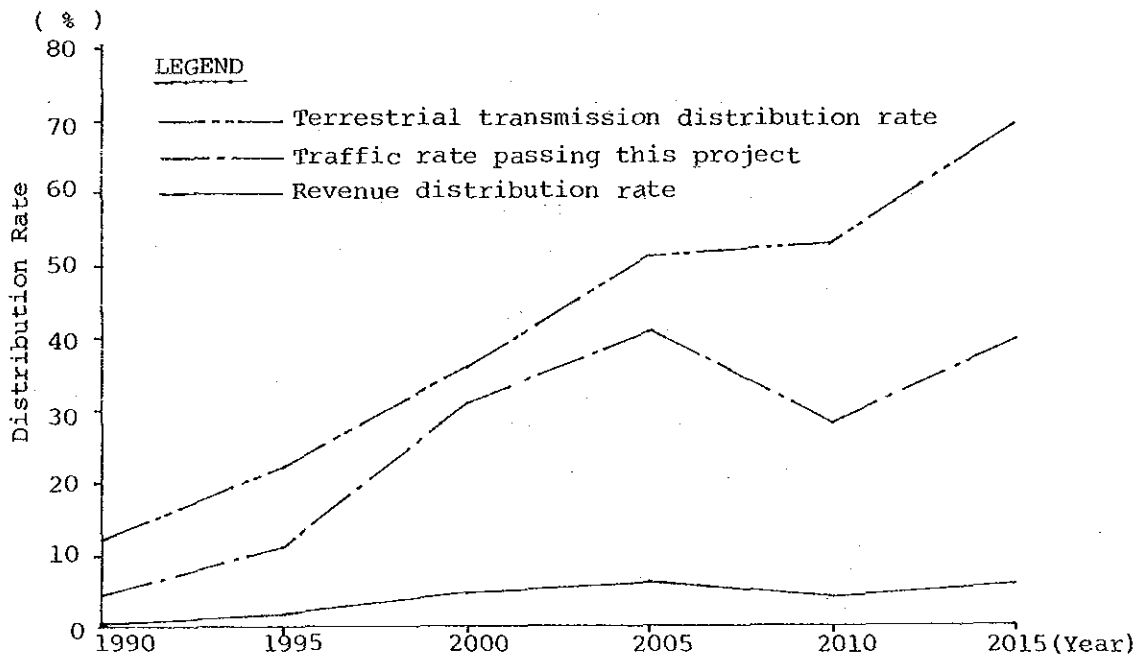


Fig. 8-3 Variation of Distribution Rate for Traffic and Revenue

The terrestrial transmission traffic in the areas related to the Project are expanding each year with differed increase rates. The traffic distribution rates passing through the Project will get down at a time upto 2005 due to the expansion of other on-the-ground transmission facilities but will go up again after 2010. The peak time of traffic distribution rate will fall on 2005. The revenue distribution rate of this Project will differ each year according to this traffic pattern. That is to say, the philosophy is based on that the weight of the Project as transmission facility for the related areas is weight-averaged in accordance with the progress of other long-term projects.

8.4.4 Direct Benefit Calculation

(1) Tariff system

Tariff system as basis of direct benefit to arise from project implementation is shown in Table 8-9, and 8-10.

Existing tariff system is based on revision in February 1985. PERUMTEL plans tariff raise by 20% every two years. All expenses and benefit are estimated at price level as of 1986 and then discounted to present value so that, for tariff also, unit price is assumed to be constant, and, on this basis, benefit calculation proportional to forecasted future demand is carried out.

For manual switching toll calls, ordinary service tariff is 50% of automatic toll tariff and urgent service tariff is the same as automatic toll tariff. Minimum charge is on first three minutes and additional charge on each succeeding minute.

Charging on automatic service is by pulse meter. Tariff per pulse has been raised to Rp. 75 from previous Rp. 60. At this new rate, tariff earning power is 1.25 times as much as before.

Tariff differentiation by utilization purposes is not adopted in Indonesia.

For telex service, subscription fee is the same as in the case of telephone service. Standing charge is Rp. 75,000 uniformly. Communication charge is Rp. 75/pulse and this rate also is the same as in telephone service. However, service distance classification and pulse intervals by service distance differ from those in the case of automatic telephone service.

For local calls, three minutes/pulse system is now adopted in Jakarta only. In other areas, one pulse is for each complete call.

For automatic toll calls, pulse meter speed varies by service distance classification. Six different pulse meter speeds are used, ranging from one minute/pulse speed for local calls between different exchanges that share the same exchange code to two seconds/pulse speed for 1,000 km long distance calls.

Tariff system thus established is assumed to continue from 1989 through 2014.

Table 8-9 Telephone Tariff Indonesia

April 1985

Classification of Area	Installation Fee		Extra Additional Fee		Brunch Tel. Inst. Fee	Rental Fee/		RP.	3 minutes Fee RP.	SLDD & INTERLOCAL
	RP.	RP. (Route)	RP. (No Route)	RP.		A U T O	JAKARTA BANDUNG SEMARAN SURABAYA MEDAN			
I	500,000	50,000	100,000	63,000				3,500	Only Jakarta Subscribers & P.C.O	
II	350,000	40,000	80,000	32,000				2,000	RP. 75 : JAKARTA	
III	200,000	40,000	80,000	19,000				2,000	RP. 50 : P.C.O	
IV	175,000	30,000	60,000	13,000				1,000		See Table 8-10
V	125,000	20,000	40,000	10,000				1,000		
VI	90,000	20,000	40,000	7,000				2,000		
VII	75,000	20,000	40,000	3,750				2,000		

Table 8-10 SLDD and Interlocal (Manual Trunk Call) Fee
April 1985

Z O N E	Distance (km)	S L D D					
		Manual Trunk call		Metering Pulse Interval(sec.)		Fee for one minute (RP.)	
		Fee for One minute (RP.)		Day		Night	
		Day	Night	Day	Night	Day	Night
		0.600 - 22.00	0.600 - 22.00	0.600 - 22.00	0.600 - 22.00	0.600 - 22.00	0.600 - 22.00
-	0 - 25	75	75	75	75	75	75
I	25 - 100	750	6	6	12	750	375
II	100 - 200	900	5	5	10	900	450
III	200 - 300	1,125	4	4	8	1,125	563
IV	300 - 1,000	1,500	3	3	6	1,500	750
V	1,000 -	2,250	2	2	4	2,250	1,125

(2) Revenue philosophy

1) Domestic Communication Revenue

The projected submarine cable system is a transmission system that connects Kalimantan and Jawa. For communication system, it is linked to national network so that service tariff estimate should be made on national level. Unit price of each revenue item, such as telephone/telex/Leased circuit service, is also considered at national level though the number of subscribers. In other works, though "the terrestrial transmission system 2000" already has been planned Sulawesi-Kalimantan submarine cable system by year of 2000, this submarine cable system is also taken into consideration according to demand forecast for traffic from Sulawesi. For other future traffic demand relating to the Project, study was made on the assumption that all projects for national network formation would be implemented. For consumer's surplus estimate also, such philosophy holds true.

2) International Communication Revenue

International communication services in Indonesia are under the jurisdiction of INDOSAT. PERUMTEL share of revenue from originating international call service is 25% of total international communication revenue. This share should be considered in FIRR calculation for PERUMTEL's revenue.

On method to estimate service tariff revenue is to multiply the number of subscribers by international communication ratio at national level wherein secondary and tertiary industry ratio in Kalimantan, Sulawesi, Halmahera, etc is taken into account. This time, however, no assumption is made that by the current projet implementation, industrial structure in the whole of such island will make radical

change. Hence the application of existing international communication pattern in Kalimantan and related islands.

(3) Revenue calculation

Based on the foregoing revenue philosophy, revenue estimate is made for each type of direct benefit.

1) Telephone Service Revenue

Telephone service revenue consist of installation fee, rental fee and call tariff.

(A) Installation Fee

Installation fee varies according to characteristic of areas. Area I covers Jakarta. Area II comprises Medan and other local big cities. Area VII is for small scale exchange including manual exchanges. Installation fee scales down as area grade descendent from I to VII. Objective area of installation fee by the current project is mainly Kalimantan and Sulawesi so that the fee of Rp 200,000 that applies in Area III is proposed.

(B) Rental Fee

Rental fee is classified into two categories. One is for automatic exchange area and the other for manual exchange area. Twofold categories are by the number of line units installed also. In Indonesia, automatic exchange ratio is about 90% and changeover to digital automatic system will continue. Hence the use of Rp 2,000/month rental fee that applies in automatic exchange area.

(C) Call Tariff

Call tariff comprise local call tariff, toll call tariff and international call tariff. Tariff revenue calculation is by busy hour originating and terminating calling rate traffic forecast made in CHAPTER 3.

When busy hour originating and terminating traffic is divided by concentration ratio, traffic per day can be obtained. Division of traffic per day by mean holding time of complete calls produces per day mean in the number of calls. Then, by multiplying per day mean in the number of calls by call completion ratio, annual mean of working days and revenue per complete call, yearly call tariff revenue can be known. Basic formula of tariff revenue calculation follows:

$$YR = \frac{BT}{MT} \times \frac{BCR}{MT} \times CR \times RC \times WD \times Sub. \times \%$$

where

- YR : Yearly revenue
- BT : Busy hour originating and terminating traffic
- BCR : Busy hour concentration ratio (12.5%)
- MT : Mean holding time of complete calls (3 minures)
- CR : Call completion ratio (40%)
- RC : Revenue per complete call (Rp. 1,200)
- WD : Annual average of working days (302 days)
- Sub : Number of Telephone Subscriber
- % : Annual Revenue Distribution Ratio

Average service meterings per subscriber in the whole of Indonesia are on the uptrend form about 6,200 pulse in 1973 to about 11,800 pulse in 1983. In Kalimantan, the uptrend is from about 11,600 pulses in 1979 to about 15,600 pulses in 1982, and, in Sulawesi, from about 9,800 pulses in 1979

to about 12,900 pulse in 1982. Both are 10-30% higher than the national average. This fact is taken into account in service revenue per call estimate.

The projected submarine cable system, this time, constitutes out-of-island transmission facilities so that terminating call service revenue is assumed to be of the same rate as originating call service revenue.

(D) International Call Service

For international cable service revenue by the current project, estimate is made from annual mean tariff imposed per subscriber as obtained from INDOSAT financial statements., Calculation formula as follows:

International call service revenue by years	=	Newly accumulated number of supply tariff/subscriber * x %
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* in considering Kalimantan and Sulawesi GRDP compared with Jawa GRDP, annual mean tariff per subscriber is assumed to be Rp. 16,500.

2) Telex Service Revenue

Telex service revenue consists of installation fee, communication charge and lease rate.

A. Fee

- Installation fee is the same as in telephone service revenue. Communication charge is Rp 50 per metering pulse and metering time interval differs by service distance as shown below.

Service Distance (km)	Metering Time Interval (sec)
- 50	12
50 - 300	8
300 - 750	6
750 -	3

- Lease rate is Rp 7,500/month.

B. Revenue calculation by revenue item is as under.

- Installation fee revenue:

Number of new subscribers
by years \times Rp 125,000 \times %

- Lease fee revenue:

Newly accumulated
Number of subscribers \times Rp 7,500 \times 12 months \times %
by years

- Communication charge revenue:

Newly accumulated Annual total
number of subscribers \times of metering \times Rp
by years 50/pulse * \times %

* This time, annual total metering pulse per terminal is assumed to be 6,000.

- International telex service revenue:

Assumed to be 50% of international telephone service revenue.

3) Leased Circuit Service

Leased circuit service revenue is estimated as same as number of telex circuit excluding international telex service in accordance with circuit requirement estimated in Chapter 3.

4) Telegram Service Revenue

Telegram service is available to all users who only pay message transmission fee. By reason of simple procedure required, telegram users are more widely spread than telex users. Nevertheless, telegram service demand is being replaced by telephone and telex service demand as the latter two services are being fast diffused. Existing demand growth by about 8% annually will slow down gradually to suffer stalemate by the year 2000.

Telegram service revenue estimate is made from PERUMTEL financial statements and from the number of words used in messages so far in Kalimantan and other eastern regions. Because of the foregoing demand behavior, service revenue after 2000 is assumed to remain fixed. Calculation formula as follows:

$$\text{Telegram service} = \text{Rp } 24.01/\text{Word} \times \text{Annual total number of words in originating messages} \times \%$$

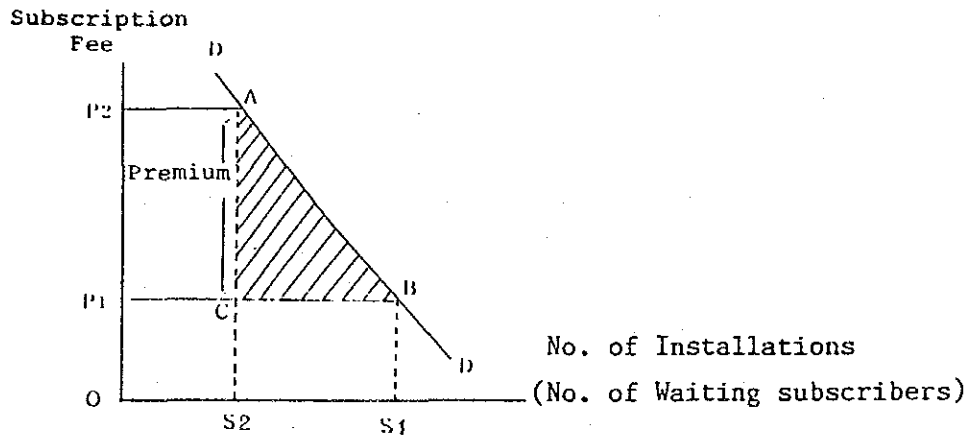
8.4.5 Consumer's Surplus (Willingness to Pay among Users)

(1) Consumer's Surplus Philosophy

General philosophy of consumer's surplus introduced below is to be applied to the current project also. It is necessary to determine revenue distribution ratio of indirect benefit as

well as direct benefit assumption. In general, the amount of consumer's surplus is inversely proportional to expansion percentage of telecommunication facilities invested in the objective area. This project occupies only small portion (less than 6%) of total telecommunication system, so the same percentage as direct benefit distribution ratio is applied to the revenue distribution ratio of indirect benefit.

For subscription fee, consumer's surplus takes shape in the form of premium. For communication charge, it depends upon willingness to pay on the part of users. This means that for the current project, gross consumer's surplus estimate is made in the form of estimate, from subscriber demand forecast for the said islands, of the amount which subscribers are willing to pay, and then, estimate of willingness to pay per subscriber.



Suppose that the present telephone supply is OS_2 and installations OP_1 . Demand relationship is represented by OD wherein waiting subscribers BC exist. For OS_2 as the number of installations, up to a maximum P_2 of applicant subscribers are willing to pay subscription fee. Thus, the balance AC presents premium, causing the current project benefit from social viewpoint to be equal to the triangle ABC .

Consumer's surplus philosophy concerning call charge also, like subscription fee and standing charge, is intimately related to the right side-down demand curve. Here is an example. When the consumer (subscriber) can utilize telephone only once even though he wants to do so several times during the day, he is willing to pay higher tariff per call than when he can use telephone freely. This means that he has no objection to paying higher tariff than actually imposed on his call. Ordinarily, the tariff rate is fixed so that he has only to pay tariffs on all his calls at the same rate. This is applicable to the non-subscriber consumer also. However, for such consumer's surplus estimate, data available are scarce. Hence consumer's surplus is estimated as follows.

(2) Consumer's Surplus Estimate

For consumer's surplus benefit that derives from this project, estimates are made as under for Kalimantan, Sulawesi and other related areas.

1) Payable Fees

Similar to direct benefit, the telephone system will have three kind of fees, viz. installation, basic and conversation. As for installation and basic fees, according to "JICA Report", the premium will be assumed on the bases of the estimated payable fees (for instance, the subscription fee of telephone in the related areas of the Project is the highest in Karimantan Timur amounting to some RP. the Project is the highest in Karimantan Timur amounting to some RP. 860,000 and the lowest in Karimantan Barat amounting to RP. 280,000) and by setting up an averaged payable fee of all the related areas (P2) from where the present fee (P1) are to be deducted. The same way of assumption is to be taken for telex. The premium is calculated from the established fee of P2 as follows:

A. Premium of Telephone

- Subscription Fee : RP.525,000 - RP.200,000
= RP.325,000/year

- Basic Fee : RP.5,250 - RP.2,000
= RP.3,250/month

B. Premium of Telex

- Installation Fee : RP.328,000 - RP.125,000
= RP.203,000/year

- Rental Fee : RP.19,700 - RP.7,500
= RP.12,200/month

2) Numbers of Installation

Similar to subscription fee, the numbers of installation will be assumed according to "JICA Report".

For telephone service, revenue sources are threefold, i.e., installation fee, standing charge and call tariff, as in the case of direct benefit. For installation fee and standing charge, consumer's surplus consists of still waiting subscribers list. According to JICA Report, the rate of supply to relieve unfulfilled demand during 1975 through 1982 improved from 9% to 36%, or 18% in annual average, still leaving no small part of demand unfulfilled. For call tariff, consumer's surplus cannot be estimated accurately that it is assumed to be 15% of annual tariff revenue. In this case, latent demand due to lack of facilities is also taken into account.

As for telex service, consumer's surplus estimate is by the same philosophy as in telephone service. Judging from demand

and supply data as of 1984, demand fulfillment rate is about 93% high. Hence uniform 7% consumer's surplus.

For leased circuit and telegram services, consumer's surplus estimate is not made. This is because the corresponding circuit ratio in this project is low.

3) Calculation of Consumer's Surplus

Through the above conditions of assumption, the consumer's surplus is obtained as follows:

A. Consumer's Surplus for Telephone

Installation fee = No. of waiting subscribers x
Rp.325,000 * x 1/2 x % **

Rental fee = No. of waiting subscribers x
Rp.3,250 x 12 months x 1/2 x % **

Call tariff = average calling tariff/subscriber x 15% x
% **

* Estimated premium amount

** Annual revenue distribution ratio

B. Consumer's Surplus for Telex

Installation fee = No. of waiting subscribers
x Rp 203,000 * x 1/2 x % **

Lease fee = No. of waiting subscribers x Rp.12,200
x 12 months x 1/2 x % **

Communication charge = average calling tariff/
subscriber x 7% x %^{**}

* Estimated premium amount

** Annual revenue distribution ratio

8.4.6 Gross Benefit Calculation

Gross benefit consist of direct revenue and Consumer's surplus is estimated by years of the foregoing tariff categories. Total revenue is shown in Table 8-11. Calculation is based on benefit distribution ratios to assumption of equipment investment items as per Paragraph of 8.4.3. Benefit period is from 1989 to 2014 when the projected submarine cable system service life terminates. As for the benefit in 1989, however, that of only a quarter of year is included since the opening of the Projet is scheduled to fall on early-October. Incidentally, the changes of direct benefit show that the amount is small less than $RP.2 \times 10^9$ /year due to the little revenue distribution rate upto 1995. The amount of benefit for 10 years starting from 1996 upto 2005 will largely be increased and the benefit distribution of $RP.20 \times 10^9$ /year, 10 times larger than that of the initial phase, can be expected after 2000. The benefit will get down during the period of 2005 - 2010 due to the decrease of traffic distribution rates but will go up again after 2010. The amount of benefit distribution will reach the peak at the final year of the Project and will show some $RP.60 \times 10^9$. Among these benefit distributions, the revenue from telephone will occupy some 95%. Under the present conditions of benefit assumption, the amount of indirect benefit occupies some 12% among the whole economic benefit.

8.4.7 Economic Internal Rate of Return (EIRR)

From the foregoing economic cost and benefit estimate, economic internal rates of return of the proposed two plans are calculated as under.

In case of this project, differential expenditure affects EIRR result, because revenue of project is the same amount for both plans.

Original Plan 2x140	18.0 %
Alternative Plan 1x280	18.9 %

Cash flows leading to EIRR calculations for Original Plan 2x140 and Alternative Plan 1x280 appear in Table 8-12 and Table 8-13.

8.5 Optimum Investment Plan Selection

8.5.1 Optimum Plan Selection

The foregoing study shows that in all two plans, EIRR exceeds the upper limit out of 13% which is proposed by REPELITA IV and 8-15% which the World Bank specifies as opportunity cost of capital in the developing country. Hence the adjustment that the current project contributes a great deal to the development of Indonesia's national economy.

However, selection of Alternative Plan 1x280 wherein EIRR is highest as optimum plan is reasonable from the angle of economic analysis.

8.6 Financial Evaluation for Optimum Plan

8.6.1 Financial Analysis

Analysis is made concerning whether the optimum plan selected, i.e., Alternative Plan 1x280, brings profit to PERUMTEL, the project executing entity, from managing activity pertaining to the current project. Based on analysis result, financial program is formulated.

(1) Financial internal rate of return (FIRR)

Cash flow whereby to calculate financial internal rate of return (FIRR) as yardstick to profitability to PERUMTEL providing that other telecommunication system components to be newly constructed according to demand forecast.

Breakdown of FIRR is in Table 8-14.

EIRR	FIRR
18.9 %	17.1 %

Major reason for FIRR of PERUMTEL becoming about 1.8 % lower than EIRR resides in consumer's consideration. That is to say, in EIRR calculation by PERUMTEL Revenue of Consumer's Surplus is not declared on cash inflow account. However, in EIRR calculation by nationwide, consumer's surplus forms a declared revenue item.

Another reason lies in revenue decrease. This is due to the assumption that revenue distribution to PERUMTEL in international telephone service is a part of total revenue, and such is the case with international telex service revenue also.

(2) Sensitivity Analysis

Results of sensitivity analysis concerning FIRR up/down variations to cost/benefit are under.

Table 8-15 Project FIRR Variations (%)

	-20%	-10%	-5%	0	+5%	+10%	+20%
Revenue increase/decrease	15.2	16.2	16.7	17.1	17.6	18.0	18.8
Cost increase/decrease	19.1	18.1	17.6	17.1	16.7	16.3	15.6

Above figures indicate that profit ratio of total liabilities and net worth of the current project is wholesome to survive conceivable environmental changes.

Revenue increase/decrease in Table 8-15 results from tariff system modification, as well as changes in demand fulfillment degree. Even though terminating call revenue ratio to gross revenue, i.e., 50%, is forced to shift to 30% by external factors, the current project profitability remains not fatally affected from viewpoint of non-optimistic factor.

The current project can still be profitable even if the project cost exceeds by 20% affected by inflation, increase of physical contingency and variation of foreign exchange rate etc.

Besides, the revenue is relatively underassumed so no factors directly affecting on the project revenue can be found.

Rather, a variation factor is whether the long-term communication system improvement plan of the whole Indonesia can be proceeded or not as scheduled.

(3) Financial Program

As for financial requirement and fund raising strictly for the current project, study is made under the same conditions as those used in financial cost estimate in the preceding section. Assumptions applicable to financial programs are as under.

1) Necessary Funds

Out of gross investment amounting to Rp. 43.4×10^9 , foreign currency portion (Rp. 40.0×10^9) is to be procured in the form of long term loan from the Government of Indonesia (repayment period: 15 years, rate of interest: 12% per annum, grace period: 5 years). Local currency portion is to be founded by PERUMTEL's net worth because remaining amount is only Rp. 3.4×10^9 .

In brief, out of gross investment required, 92 % is to be covered by long term loan, 8 % by fund in hand.

2) Depreciation

PERUMTEL adopts the straight line depreciation method according to types of fixed assets. Thus, for the current project, depreciation of invested capital is to be made in the same way as in equipment salvage value estimate of the time the project life terminates, as described in the preceding section. In other words, depreciation percentage of submarine cable and terrestrial microwave system are at a yearly rate 4% and 5% respectively in accordance with their service life.

3) Working Capital

Working capital to cover accrued telephone service revenue and to finance supplies inventory, which is essential for PERUMTEL's business operation, is to be prepared at 25% of revenue balance of each operation year.

Annual working capital is not an expense but a capital. Accordingly, the sum of the appropriated value for each year shall be introduced into the profit account at the year when the project terminates.

4) Maintenance and Operation Cost

Maintenance and operation cost calculation is by the ratio (2.8%) to total amount of investment estimated in the preceding section. Administration cost is also implied in the said ratio.

5) Others

A. Exchange Rate

Project cost calculation is at price level and by exchange rate as of January 1986 (US\$ 1 = Rp 1,120 = ¥ 200).

B. Contingency

No inflation should be taken into account. This means that the price at 1986 constant should be used as basic price during whole project life. Consequently, the tariff as 1986 should be used throughout the analysis.

Physical contingency to work volume increment is to be confirmed by sensitivity analysis. Therefore, physical contingency is to be excluded from investment cost.

C. Distribution of Profit

PERUMTEL's financial practice of appropriating 55% of the net profit after tax to the national development fund, and of retaining 25% internally and the remaining 20% as differed profit for losses shall be applied to this project as they are.

D. Tax

Tax rate reflects the Dec. 1984 change where the rate has reduced from 45% to 35%.

Profit and Loss Statement is shown in Table 8-16 based on the aforementioned preconditions.

8.6.2 All-Round Analysis in Financial Aspect

Major premise for operating revenue in the current project is that expansion of other communications facilities also makes progress as planned in accordance with demand forecast. Assume debt service ratio (operating profit + depreciation/loan principal repayment + interest payment), in general, telecommunication project requires at least 1.3.

In this case the debt service ratio is 1.4 in the year of 1997, 4.1 in the year of 2000 and is gradually increased after the year of 2000. The debt service will be terminated in the year of 2009.

Other than the long-term project loan, local portion of the project cost is to be financed by the internal reserve of PERUMTEL. Rp.

5.3×10^9 as internal fund is necessary in the year of 1989 but no more fund will be required after the year of 1992.

The cumulative deficit is to be continued for 10 years upto the year of 1996 but it will turn to the black-ink balance after the year of 1997. Gross profit rate on revenue (Operating profit/Gross revenue) is to be shifted from 38% in the year of 1995 to 88% in the year of 2000.

It may safely be said that this project is good-qualified with low cost rate and profit rate be increased year by year thereafter.

The interest rate against operating revenue will go down from 2.6 to 0.14 during the same period, so it may also be said that this is an extremely sound project of investment.

8.7 Overall Project Evaluation

Findings in the foregoing quantitative analysis attest to wholesome economic impacts arising out of implementation of this project.

Not only for Indonesia in its socio-economic activities but for PERUMTEL as competent business entity also, this project is proven to hold sufficient earning power.

Following is an overall project evaluation, including qualitative analysis, from several angles, with emphasis on socio-economic significance.

8.7.1 Contribution to the Regions

This project is an overland transmission route expansion program as part of long term telecommunications system improvement plan covering relatively underdeveloped areas, such as Kalimantan, Sulawesi and Irian Jaya. Compared with Jawa, these areas lag considerably behind in regional development. (In telephone density, for instance, Kalimantan holds 0.11-0.36/100 inhabitants and Sulawesi 0.12-0.25/100 inhabitants, both being much below 2.6/100 inhabitants of Jakarta.)

Therefore, this project has a great deal to do with future telecommunications network development in the islands east of Sulawesi. This time, the project is to expand Kalimantan-Jawa transmission route. In the future, this route is to be further expanded to Sulawesi, Halmahera, Maluku and Irian Jaya to form a loop transmission network. Kalimantan Timur is in the coverage area of this project. It is an area where consumer's surplus per capita, valued at price level as of 1975, is as high as Rp. 803,000 (source: JICA Report) or the highest in Indonesia. In Irian Jaya also, the degree of latent demand is generally high. Therefore, in these areas, this project is expected to make appreciable contribution to regional development.

8.7.2 Expansion of Ground Transmission System

In Indonesia, a satellite communication Parapa B-2P is scheduled to be launched at the end of 1986 as large-scaled project for improvement of transmission system. But a new problem occurs upon this plan by the explosion accident of U.S. unmanned rocket. Once the system of telecommunication project is troubled, not only the communication is suspended but serious effects will be exerted upon

the whole aspects of society such as national life and company activities. From these points of view, the expansion of terrestrial transmission facilities must be proceeded along with satellite communication to establish the safety and reliability of transmission system.

8.7.3 Introduction of New Technology

Material technique is included in communication-related technology upon which the development of telecommunication is based. The transmission technology has been developed so far with the main purpose of composing a transmission network of low cost and high quality and reliability. For wire system, however, improvement of communication quality and expansion of communication volume has been aimed by the use of optical-fiber cable as new transmission media. If Indonesia introduces optical-fiber cable suitable for leveling-up and diversification of communication function, not only will it bring about a lot of benefits for construction of submarine cable as future plan but will it promote the economization of the nation. In view point of short-term, this project will qualitatively and quantitatively be improved by increasing the transmission capacity of more than 10 times of the existing troposcater microwave link.

8.7.4 TV Service

Another feature of this project lies in the consideration to avoid failure of TV transmission due to communication satellite trouble. Thus, in project evaluation, TV circuit also is taken into account though TV transmission is the secondary requirement, this time.

In Indonesia, the diffusion rate of TV sets still remains low. Growth rate itself in the number of working TV sets is considerably higher than in the neighboring countries. In concrete terms, the number of working TV sets in 1975 was about 300,000 which increased

to 1,400,000 in 1980, recording the average annual growth rate of 36% or much higher than in the neighboring countries.

According to JICA-TV Report, the number of working TV sets in the year 2000 is expected to reach 40 times the number at present. The number of working color TV sets in the year of 2000 will occupy nearly 95% out of the total number of working TV sets. The corresponding rate as of 1984 is 30%.

In addition to improvement and expansion of telecommunication system, the JICA-TV Report gives further the following recommendations.

- (1) The existing programme transmission network shall be greatly improved to enable to broadcast each programme to its target area in the time zone most convenient for viewers.
- (2) The programme transmission network requires the higher transmission performances than normal public telephone communication lines. The direction of transmission should be both way between the regional station to Nusantara Station not only from the Jakarta Station to regional stations.
- (3) The ideal broadcasting system is to transmit the same programme twice or three times shift at the most convenient time for listeners and viewers in areas with different standard time.
- (4) In Indonesia, the broadcasting service is effective for consolidation of islands will and unity. Socio-economic benefits by broadcasting service ought to be much greater size of construction cost for broadcasting system development.
- (5) Broadcasting network for the purpose of education has been established in many countries in the world. The educational system through the TV broadcasting is contributing to the enhancement of human development and Indonesia people are

expecting the expansion of TV broadcasting service throughout the country.

At present, TV broadcast is operated by TVRI but program transmission is governed by the agreement between PERUMTEL and TVRI. According to this agreement, TVRI is to pay to PERUMTEL the amount of US\$750-850/year of the whole transponder which it uses as leased circuit. Thus, PERUMTEL takes over TV program transmission.

Greater effects than merely such functional aspects as transmission of TV information will be exerted upon the regional inhabitants in Indonesia if TV program is broadcasted not depending upon only satellite circuit but with the use of ground facilities permanently.

From the both aspects as above, viz. telephone service as production-oriented and TV service as consumption-oriented, the implementation of this project is indispensable.

TABLE 8-11 REVENUE FLOW

(UNIT: MILLION Rp.)

DESCRIPTION	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
A. DIRECT BENEFIT																										
1. TELEPHONE	31	150	594	1171	1954	2944	4107	6610	9648	13225	17342	21998	25400	29072	33046	37197	41599	41040	40244	39220	37799	36208	40782	43497	46298	56814
1.1 INSTALLATION	5	21	57	67	84	102	115	162	205	248	291	334	326	345	372	383	403	334	312	297	260	251	225	259	266	331
1.2 RENTAL	1	2	10	21	36	54	76	123	180	248	325	413	479	548	624	703	786	777	762	743	716	686	774	825	878	1078
1.3 SLDD CALL	25	124	517	1064	1802	2739	3847	6212	9097	12502	16427	20872	24157	27676	31479	35467	39689	39217	38472	37500	36166	34642	39073	41657	44349	54417
1.4 INTERNATIONAL CALL	0	2	9	19	33	50	70	113	165	227	298	379	439	503	572	644	721	712	699	681	657	629	709	756	805	988
2. TELEX	1	5	21	41	69	104	144	232	339	464	609	772	891	1019	1159	1304	1458	1438	1410	1374	1324	1268	1428	1524	1622	1990
2.1 INSTALLATION	0	1	2	3	3	4	5	7	9	10	12	14	14	14	16	16	17	14	13	12	11	10	9	11	11	14
2.2 RENTAL	0	1	3	5	9	14	19	31	45	62	81	103	120	137	156	176	197	194	191	186	179	172	193	206	220	269
2.3 DOMESTIC CALL	1	3	12	24	40	61	86	138	203	279	366	465	538	617	701	790	884	874	857	836	806	772	871	928	988	1213
2.4 INTERNATIONAL CALL	0	1	5	10	16	25	35	56	83	113	149	189	219	251	286	322	360	356	349	340	328	315	355	378	403	494
3. LEASED CIRCUIT	1	3	12	24	40	61	86	138	203	279	366	465	538	617	701	790	884	874	857	836	806	772	871	928	988	1213
4. TELEGRAM	0	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
SUBTOTAL	33	158	627	1238	2064	3111	4339	6983	10191	13969	18318	23236	26830	30709	34907	39292	43942	43353	42513	41431	39930	38249	43081	45950	48909	60018
B. CONSUMER SURPLUS																										
1. TELEPHONE	10	44	147	240	372	533	715	1126	1609	2169	2806	3521	4003	4552	5153	5762	6416	6269	6132	5971	5729	5491	6124	6551	6962	8545
1.1 INSTALLATION	6	22	62	72	90	110	123	174	218	262	305	348	338	357	385	395	413	345	323	309	271	263	235	270	277	342
1.2 RENTAL	1	3	7	9	11	13	15	21	26	31	37	42	41	43	46	47	50	41	39	37	33	32	28	32	33	41
1.3 SLDD CALL	4	19	78	160	270	411	577	932	1365	1875	2464	3131	3624	4151	4722	5320	5953	5883	5771	5625	5425	5196	5861	6249	6652	8163
2. TELEX	0	0	1	2	3	5	7	10	15	21	27	34	39	45	51	57	64	63	61	60	58	55	62	66	70	86
2.1 INSTALLATION	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2.2 RENTAL	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
2.3 DOMESTIC CALL	0	0	1	2	3	4	6	10	14	20	26	33	38	43	49	55	62	61	60	58	56	54	61	65	69	85
SUBTOTAL	10	44	148	242	375	538	721	1137	1624	2189	2833	3555	4042	4596	5203	5819	6480	6331	6194	6030	5787	5546	6186	6617	7033	8632
GRAND TOTAL	43	202	775	1480	2439	3649	5060	8119	11815	16159	21151	26791	30871	35305	40111	45112	50423	49684	48707	47461	45716	43795	49268	52567	55941	68649

TABLE 8-12 ECONOMIC ANALYSIS (Original Plan : 2x140)

IRR= 18.0058

DESCRIPTION	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
I. ECONOMIC COST	471	3050	33337	7476	1232	1232	1232	1232	1232	1232	1232	1232	1232	1232	1688	1245	1245	1245	1245	1245
1. GLASSFIBER SUBMARINE CABLE		2052	26762	5512																
2. DIGITAL MICROWAVE SYSTEM		659	4449	924																
3. DIGITAL MUX		114	1493	317											456					
4. CONSULTANT	468	219	627	415																
5. OPERATION/MAINTENANCE	3	6	6	308	1232	1232	1232	1232	1232	1232	1232	1232	1232	1232	1232	1245	1245	1245	1245	1245
II. ECONOMIC BENEFIT				43	202	775	1480	2439	3649	5060	8119	11815	16159	21151	26791	30871	35305	40111	45112	50423
1. DIRECT BENEFIT				33	158	627	1238	2064	3111	4339	6983	10191	13969	18318	23236	26830	30709	34907	39292	43942
1.1 TELEPHONE				31	150	594	1171	1954	2944	4107	6610	9648	13225	17342	21998	25400	29072	33046	37197	41599
1.2 TELEX				1	5	21	41	69	104	144	232	339	464	609	772	891	1019	1159	1304	1458
1.3 LEASED CIRCUIT				1	3	12	24	40	61	86	138	203	279	366	465	538	617	701	790	884
1.4 TELEGRAM				0	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1
2. CONSUMER SURPLUS				10	44	148	242	375	538	721	1137	1624	2189	2833	3555	4042	4596	5203	5819	6480
2.1 TELEPHONE				10	44	147	240	372	533	715	1126	1609	2169	2806	3521	4003	4552	5153	5762	6416
1) INSTALLATION				6	22	62	72	90	110	123	174	218	262	305	348	338	357	385	395	413
2) RENTAL				1	3	7	9	11	13	15	21	26	31	37	42	41	43	46	47	50
3) LOCAL/SLOD CALL				4	19	78	160	270	411	577	932	1365	1875	2464	3131	3624	4151	4722	5320	5953
2.2 TELEX				0	0	1	2	3	5	7	10	15	21	27	34	39	45	51	57	64
1) INSTALLATION				0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
2) RENTAL				0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
3) DOMESTIC CALL				0	0	1	2	3	4	6	10	14	20	26	33	38	43	49	55	62
III. NET BENEFIT	-471	-3050	-33337	-7433	-1030	-457	248	1207	2417	3828	6887	10583	14927	19919	25103	29626	34060	38866	43867	49178
2006	2007	2008	2009	2010	2011	2012	2013	2014												
1245	1245	1245	8883	1245	1245	1245	1245	-4598												
			5714					-4286												
			1924					-1557												
1245	1245	1245	1245	1245	1245	1245	1245	1245												
49684	48707	47461	45716	43795	49268	52567	55941	68649												
43353	42513	41431	39930	38249	43081	45950	48909	60018												
41040	40244	39220	37799	36208	40782	43497	46298	56814												
1438	1410	1374	1324	1268	1428	1524	1622	1990												
874	857	836	806	772	871	928	988	1213												
1	1	1	1	1	1	1	1	1												
6331	6194	6030	5787	5546	6186	6617	7033	8632												
6269	6132	5971	5729	5491	6124	6551	6962	8545												
345	323	309	271	263	235	270	277	342												
41	39	37	33	32	28	32	33	41												
5883	5771	5625	5425	5196	5861	6249	6652	8163												
63	61	60	58	55	62	66	70	86												
1	1	1	1	1	1	1	1	1												
1	1	1	1	1	0	1	1	1												
61	60	58	56	54	61	65	69	85												
48439	47462	46216	36833	42550	48023	51322	54696	73247												

TABLE 8-13 ECONOMIC ANALYSIS (Alternative Plan : 1x280)
IRR= 18.902773

DESCRIPTION	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
I. ECONOMIC COST	471	2818	30187	6757	1118	1118	1118	1118	1118	1118	1118	1118	1118	1118	1574	1131	1131	1131	1131	1131
1. GLASSFIBER SUBMARINE CABLE		1820	23612	4821																
2. DIGITAL MICROWAVE SYSTEM		659	4449	924																
3. DIGITAL MUX		114	1493	317											456					
4. CONSULTANT	468	219	627	415																
5. OPERATION/MAINTENANCE	3	6	6	280	1118	1118	1118	1118	1118	1118	1118	1118	1118	1118	1118	1131	1131	1131	1131	1131
II. ECONOMIC BENEFIT				43	202	775	1480	2439	3649	5060	8119	11815	16159	21151	26791	30871	35305	40111	45112	50423
1. DIRECT BENEFIT				33	158	627	1238	2064	3111	4339	6983	10191	13969	18318	23236	26830	30709	34907	39292	43942
1.1 TELEPHONE				31	150	594	1171	1954	2944	4107	6610	9648	13225	17342	21998	25400	29072	33046	37197	41599
1.2 TELEX				1	5	21	41	69	104	144	232	339	464	609	772	891	1019	1159	1304	1458
1.3 LEASED CIRCUIT				1	3	12	24	40	61	86	138	203	279	366	465	538	617	701	790	884
1.4 TELEGRAM				0	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1
2. CONSUMER SURPLUS				10	44	148	242	375	538	721	1137	1624	2189	2833	3555	4042	4596	5203	5819	6480
2.1 TELEPHONE				10	44	147	240	372	533	715	1126	1609	2169	2806	3521	4003	4552	5153	5762	6416
1) INSTALLATION				6	22	62	72	90	110	123	174	218	262	305	348	338	357	385	395	413
2) RENTAL				1	3	7	9	11	13	15	21	26	31	37	42	41	43	46	47	50
3) LOCAL/SLDD CALL				4	19	78	160	270	411	577	932	1365	1875	2464	3131	3624	4151	4722	5320	5953
2.2 TELEX				0	0	1	2	3	5	7	10	15	21	27	34	39	45	51	57	64
1) INSTALLATION				0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
2) RENTAL				0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
3) DOMESTIC CALL				0	0	1	2	3	4	6	10	14	20	26	33	38	43	49	55	62
III. NET BENEFIT	-471	-2818	-30187	-6713	-916	-343	362	1321	2531	3942	7001	10697	15041	20033	25217	29740	34174	38980	43981	49292
2006	2007	2008	2009	2010	2011	2012	2013	2014												
1131	1131	1131	8769	1131	1131	1131	1131	-16813												
								-12101												
			5714					-4286												
			1924					-1557												
1131	1131	1131	1131	1131	1131	1131	1131	1131												
49684	48707	47461	45716	43795	49268	52567	55941	68649												
43353	42513	41431	39930	38249	43081	45950	48909	60018												
41040	40244	39220	37799	36208	40782	43497	46298	56814												
1438	1410	1374	1324	1268	1428	1524	1622	1990												
874	857	836	806	772	871	928	988	1213												
1	1	1	1	1	1	1	1	1												
6331	6194	6030	5787	5546	6186	6617	7033	8632												
6269	6132	5971	5729	5491	6124	6551	6962	8545												
345	323	309	271	263	235	270	277	342												
41	39	37	33	32	28	32	33	41												
5883	5771	5625	5425	5196	5861	6249	6652	8163												
63	61	60	58	55	62	66	70	86												
1	1	1	1	1	1	1	1	1												
1	1	1	1	1	0	1	1	1												
61	60	58	56	54	61	65	69	85												
48553	47576	46330	36947	42664	48137	51436	54810	85462												

TABLE 8-14 FINANCIAL ANALYSIS (Alternative Plan : 1x280)
IRR= 17.13426

DESCRIPTION	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
I. OUTFLOW	463	2890	31195	6980	1154	1154	1154	1154	1154	1154	1154	1154	1154	1154	1602	1167	1167	1167	1167	1167
1. GLASSFIBER SUBMARINE CABL		1904	24726	5058																
2. DIGITAL MICROWAVE SYSTEM		653	4374	910																
3. DIGITAL MUX		112	1468	312											448					
4. CONSULTANT	460	215	621	411																
5. OPERATION/MAINTENANCE	3	6	6	289	1154	1154	1154	1154	1154	1154	1154	1154	1154	1154	1154	1167	1167	1167	1167	1167
II. INFLOW				33	156	616	1214	2025	3051	4255	6847	9993	13697	17960	22781	26303	30106	34221	38520	43078
1. TELEPHONE				31	148	586	1156	1928	2905	4051	6520	9515	13043	17103	21695	25049	28670	32589	36682	41022
2. TELEX				1	4	17	34	56	84	117	187	273	374	489	620	715	818	930	1046	1170
3. LEASED CIRCUIT				1	3	12	24	40	61	86	138	203	279	366	465	538	617	701	790	884
4. TELEGRAM				0	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1
III. NET CASH FLOW	-463	-2890	-31195	-6947	-998	-538	60	871	1897	3101	5693	8839	12543	16806	21179	25136	28939	33054	37353	41911

2006	2007	2008	2009	2010	2011	2012	2013	2014	TOTAL
1167	1167	1167	8679	1167	1167	1167	1167	-4579	72774
									31688
			5620					-4215	7342
			1892					-1531	2701
									1707
1167	1167	1167	1167	1167	1167	1167	1167	1167	29336
42498	41674	40614	39142	37494	42230	45042	47942	58832	650324
40470	39686	38676	37273	35705	40214	42892	45654	56024	619286
1153	1131	1102	1062	1017	1145	1221	1299	1595	17660
874	857	836	806	772	871	928	988	1213	13352
1	1	1	1	1	1	1	1	1	27
41331	40507	39447	30463	36327	41063	43875	46775	63411	577551

TABLE 8-16 PROFIT AND LOSS STATEMENT

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1. OPERATING REVENUE				33	156	616	1214	2025	3051	4255	6847	9993	13697	17960	22781	26303	30106	34221	38520	43078
1.1 TELEPHONE				31	148	586	1156	1928	2905	4051	6520	9515	13043	17103	21695	25049	28670	32589	36682	41022
1.2 TELEX				1	4	17	34	56	84	117	187	273	374	489	620	715	818	930	1046	1170
1.3 LEASED CIRCUIT				1	3	12	24	40	61	86	138	203	279	366	465	538	617	701	790	884
1.4 TELEGRAM				0	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1
2. OPERATING EXPENDITURE	3	6	6	289	2633	2633	2633	2633	2633	2633	2633	2633	2633	2633	2653	2666	2666	2666	2666	2666
2.1 O/M COST	3	6	6	289	1154	1154	1154	1154	1154	1154	1154	1154	1154	1154	1154	1167	1167	1167	1167	1167
2.2 DEPRECIATION					1479	1479	1479	1479	1479	1479	1479	1479	1479	1479	1499	1499	1499	1499	1499	1499
A) OPERATING NET REVENUE	-3	-6	-6	-256	-2477	-2017	-1418	-608	418	1622	4214	7360	11064	15327	20128	23637	27440	31555	35854	40412
3. INTERESTS PAID																				
3.1 FOREIGN LOAN		55	363	3891	4549	4549	4549	4546	4522	4262	3959	3656	3352	3049	2746	2442	2139	1836	1533	1229
B) INCOME BEFORE TAX	-3	-61	-369	-4146	-7027	-6566	-5968	-5153	-4104	-2640	255	3704	7712	12278	17382	21195	25300	29719	34321	39182
C) CUMULATIVE DEFICIT	-3	-64	-433	-4580	-11606	-18172	-24140	-29294	-33397	-36037	-35782									
4. CORPORATION TAX												-11227	2699	4297	6084	7418	8855	10402	12012	13714
D) NET INCOME	-3	-61	-369	-4146	-7027	-6566	-5968	-5153	-4104	-2640	255	14931	5013	7981	11299	13777	16445	19318	22309	25469
DEVELOPMENT FUND												-11468	2757	4389	6214	7577	9045	10625	12270	14008
DEFERRED PROFIT												-5213	1253	1995	2825	3444	4111	4829	5577	6367
RETAINED EARNING												-4170	1003	1596	2260	2755	3289	3864	4462	5094

(UNIT: MILLION Rp.)

	2006	2007	2008	2009	2010	2011	2012	2013	2014
	42498	41674	40614	39142	37494	42230	45042	47942	58832
	40470	39686	38676	37273	35705	40214	42892	45654	56024
	1153	1131	1102	1062	1017	1145	1221	1299	1595
	874	857	836	806	772	871	928	988	1213
	1	1	1	1	1	1	1	1	1
	2666	2666	2666	2666	2666	2666	2666	2666	2666
	1167	1167	1167	1167	1167	1167	1167	1167	1167
	1499	1499	1499	1499	1499	1499	1499	1499	1499
	39832	39008	37948	36476	34828	39564	42376	45276	56166
	926	623	323	44					
	38907	38386	37625	36432	34828	39564	42376	45276	56166
	13617	13435	13169	12751	12190	13847	14832	15847	19658
	25289	24951	24456	23681	22638	25717	27545	29430	36508
	13909	13723	13451	13024	12451	14144	15150	16186	20079
	6322	6238	6114	5920	5660	6429	6886	7357	9127
	5058	4990	4891	4736	4528	5143	5509	5886	7302

29335.5

TABLE 8-17 SOURCE AND APPLICATION

DESCRIPTION	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
I. CASH OUTFLOW	463	2945	31558	10878	5734	5819	5884	6104	8093	8245	8288	-3104	10659	12093	14164	14436	15639	16961	18314	19777
1. CAPITAL EXPENDITURE	460	2884	31189	6691											448					
2. OPERATING EXPENCES	3	6	6	297	1185	1269	1304	1357	1410	1455	1802	-9287	4779	6517	8443	9466	10973	12598	14254	16020
2.1 WORKING CAPITAL				8	31	115	150	203	256	301	648	786	926	1066	1205	881	951	1029	1075	1139
2.2 O/M COST	3	6	6	289	1154	1154	1154	1154	1154	1154	1154	1154	1154	1154	1154	1167	1167	1167	1167	1167
2.3 TAXES												-11227	2699	4297	6084	7418	8855	10402	12012	13714
3. DEBT SERVICE		55	363	3891	4549	4549	4580	4748	6683	6790	6486	6183	5880	5576	5273	4970	4667	4363	4060	3757
3.1 PRINCIPAL REPAYMENT							31	202	2161	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527	2527
3.2 INTEREST		55	363	3891	4549	4549	4549	4546	4522	4262	3959	3656	3352	3049	2746	2442	2139	1836	1533	1229
II. CASH INFLOW	463	2945	31558	10878	5734	5819	2693	3504	4530	5734	8326	7301	16178	21035	26540	30558	34894	39584	44480	49670
4. RETAINED EARNINGS												-4170	1003	1596	2260	2755	3289	3864	4462	5094
5. DEPRICIATION					1479	1479	1479	1479	1479	1479	1479	1479	1479	1479	1499	1499	1499	1499	1499	1499
6. OPERATING REVENUE				33	156	616	1214	2025	3051	4255	6847	9993	13697	17960	22781	26303	30106	34221	38520	43078
7. LOAN FUND	460	2567	29394	5491																
8. SELF-FINANCE	3	378	2164	5354	4100	3724														
III. NET FLOW(SURPLUS/DEFICIT)	0	0	0	0	0	0	-3191	-2600	-3564	-2511	38	10405	5519	8941	12375	16122	19254	22623	26166	29893
DEBT SERVICE RATIO				-0.07	-0.22	-0.12	0.01	0.18	0.28	0.46	0.88	1.43	2.13	3.01	4.10	5.06	6.20	7.58	9.20	11.16

(UNIT: MILLION Rp.)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	TOTAL SURP
	18093	17515	16719	21472	12945	16198	16702	17739	8839	
				7512						
	14640	14396	14071	13550	12945	16198	16702	17739	8839	
	-145	-206	-265	-368	-412	1184	703	725	-11986	
	1167	1167	1167	1167	1167	1167	1167	1167	1167	
	13617	13435	13169	12751	12190	13847	14832	15847	19658	
	3453	3119	2649	410						
	2527	2497	2326	366						
	926	623	323	44						
	49055	48164	47004	45377	43521	48872	52050	55327	67632	
	5058	4990	4891	4736	4528	5143	5509	5886	7302	
	1499	1499	1499	1499	1499	1499	1499	1499	1499	
	42498	41674	40614	39142	37494	42230	45042	47942	58832	
	30962	30648	30285	23905	30576	32674	35348	37589	58793	450252
	11.97	12.99	14.89	92.62						

JRIN