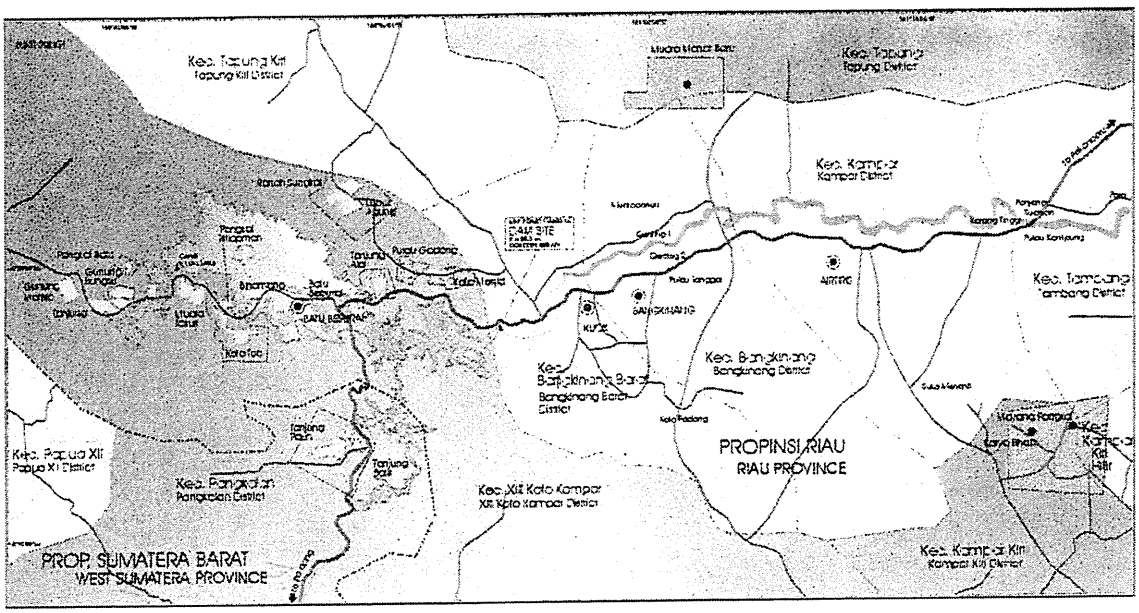
JBIC SPECIAL ASSISTANCE FOR PROJECT SUSTAINABILITY(SAPS)
FOR

KOTAPANJANG HYDROELECTRIC POWER AND ASSOCIATED TRANSMISSION LINE PROJECT IN REPUBLIC OF INDONESIA



INTERIM REPORT
APPENDICES

May 2002

SAPS TEAM
FOR
JAPAN BANK FOR INTERNATIONAL COOPERATION (JBIC)

JBIC SPECIAL ASSISTANCE FOR PROJECT SUSTAINABILITY (SAPS)
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Chapter 1 Relevance

1.1 Relevance at the Time of JBIC Appraisal

1.1.2 Power Development Plan in the Region at the time of the Appraisal[*1]

To meet the growth in power demand, PLN was making concreted efforts to utilize non-oil resources, particularly hydropower and coal, for power generation. In addition, it is concurrently carrying out the study for expansion of the transmission line system in order to supply economical and reliable power to areas requiring such power.

With respect to the transmission line system, a detailed study was carried out in the Central Sumatra F/S, in which the optimum system to be installed by 1995 was determined. In the transmission line study, the importance of early interconnection of the power system between West Sumatra and Riau was stressed, assuming that the Ombilin Coal-Fired Power Plant (50MW x 2 Units) was to be commissioned in the early 1990's. By 1995, however, further new power sources, equivalent to approximately 100 MW, were expected, even if all planned diesel plants together with the Ombilin Power Plant were commissioned on schedule. Therefore, the Kotapanjang Hydroelectric Power Plant can meet this power demand.

To promote the interconnection of the power system between West Sumatra and Riau, a transmission line between Ombilin and Pekanbaru was planned. This line was divided into two sections. The first section was 64 km long between Kotapanjang and Pekanbaru. A second line was originally proposed nearly 140 km long between Ombilin and Kotapanjang. The second line was changed from Kotapanjang to Payakumbuh (nearly 85 km long) and included in the scope of the Kotapanjang project. Both these sections of transmission line, together with Pekanbaru Substation and other associated substations, should be commissioned by March 1994, so that an economical and stable power can be transmitted to Pekanbaru.

Table 1-1: Installed Capacity of the Sumatra Island in 1988/99 (Unit: MW)

	Hydro	Thermal	Diesel	Gas	Geothermal	Total
Region I	0.4	0.0	149.7	0.0	0.0	150.1
Region II	3.2	130.0	128.5	244.6	0.0	506.3
Region III	78.7	0.0	163.2	43.2	0.0	285.1
Region IV	2.4	155.0	296.2	64.5	0.0	518.1
Total of Sumatra	84.7	285.0	737.6	352.3	0.0	1,459.6
Outside Java	152.0	310.0	1,649.9	430.8	0.0	2,542.7
Java Island	1,817.5	3,107.0	119.2	802.8	140.0	5,986.5
Indonesia Total	1,969.5	3,417.0	1,769.1	1,233.6	140.0	8,529.2

Source: JBIC Appraisal Report, 1990

From the latest data in 1988, the installed capacity in Riau Province at that time was only 6 MW which was provided by Diesel Power Plants, however, the demand forecast

[1] Source: "Project Completion Report", TEPSCO, Chapter 4, 4.1 Demand and Supply of Electric Power, page 1-89, 90

by Fifth Five Year Plan (1988- 1993 REPELITA V) showed 150 MW. This was mainly based on the future industrial sector, forestry industrial sector, and etc.

Table 1-2: Demand – Supply Forecast of the Region III (Unit: MW)

	Actual	Forecast								
	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Installed Capacity	285	313	309	318	458	461	567	562	741	748
Dependable Capacity	197	225	221	230	370	373	410	405	490	491
Largest Unit	17	17	17	17	65	65	65	65	65	65
Firm Capacity	180	208	204	213	305	308	345	340	425	426
Peak Load	157	177	198	222	246	273	291	321	353	387
Reserve Capacity[2]	23	31	6	-9	59	35	54	19	72	39
Reserved Capacity Ratio[3]	14.6%	17.5%	3.0%	-4.1%	24.0%	12.8%	18.6%	5.9%	20.4%	10.1%

Source: JBIC Appraisal Report, 1990

1.2 Relevance of the Project at Present

The Ministerial Energy Coordination Board (BAKOREN) issues general policy guidelines on energy matters. The Technical Committee on Energy reports to BAKOREN and provides an active forum for consideration of energy-related policy and technical issues. The Permanent Working Group on Energy conducts analysis of energy supply and use on a quarterly basis, serves as a forum for exchange of data and information, and prepares technical reports for Technical Committee on Energy.

1.2.1 Current General Energy Policy (KUBE)

Indonesia's energy resources consist of fossil energy and renewable energy. Fossil energy i.e. oil, natural gas, and coal are extremely important and play a strategic role. These resources are valuable for national development, functioning as energy resources and industrial raw material as well as foreign exchange earner.

Oil reserves are not large, compared to the world's oil reserves, Indonesia's oil reserves are small, being only about 0.6%. The potential of natural gas are also not too much, compared to the world's reserves, Indonesia's natural gas reserves only about 1.6%. While the proven reserves of coal is only 5 billion tons. Compared to the world's reserves, Indonesia's coal reserves are about 3.1%.

Energy resources considered as renewable energy are biomass, solar energy, geothermal, hydropower, and wind energy. Indonesia has a fairly large potential of biomass energy. The whole potential of biomass energy from the three sectors of forestry, agriculture and estates, amounts to the equivalent of about 50,000 MW.

To achieve this objective, the utilization of energy resources need to be shifted in the stages from export of energy towards energy use in support of the industrialization process such that sustainable development is attained. The most optimum energy

[2] Reserve Capacity: Firm Capacity – Peak Load

[3] Reserve Capacity Ratio: Reserve Capacity/ Firm Capacity

resources allocation needs to be achieved. The government of Indonesia has adopted a General Energy Policy (KUBE: Kebijaksanaan Umum Bidang Energi) covering five goals:

a) Energy diversification

Utilization of a variety of energy, including the renewable, in order to achieve the most economic national energy supply and to reduce hydrocarbon resource recovery rate, and to obtain a maximum net national benefit which ensures sustainable development

b) Intensification of exploration for Energy Sources

Survey and exploration to search for new hydrocarbon energy sources in areas which have never been surveyed, in order to upgrade their status to proven reserves.

c) Energy Conservation

The principle of conservation will be applied on all stages of utilization, beginning with energy use at its source up to its end use to ensure the fulfillment of the future generation's needs. The conservation effort will be applied on the upstream and the downstream sides.

d) Energy Price

The average energy price will be adjusted in a planned and deliberate way while following the market mechanism, it will take into account a number of aspects, namely the optimization of energy utilization, increasing economic competitiveness, protection of consumers, and the principle of equitable distribution. In Indonesia, fuel oil price has heavily subsidized since long ago, however, at present the Indonesian Government try to withdraw subsidy particularly for industrial consumers. The subsidy for oil for industrial consumers has progressively removed, and it will completely varnish up to 2003.

Table 1-3: Government Subsidy to Oil Fuel in 1999

Type of Fuel Oil	Dom. Price Rp./liter	Cost Rp./liter	Subsidy Rp./liter	Consumption KL (000) Tot	Subsidy US$/MMBTU
Gasoline	1000	1377	377	9,200	3.47
Kerosene	280	1334	1054	9,129	9.62
ADO	550	1291	741	16,053	11.90
IDO	500	1291	791	1,210	0.96
Fuel Oil	350	1205	855	4,726	4.04
Total				40,317	23.99

* Based on oil price of US$ 25/BBL, and foreign exchange Rp.8000/US$ Data Source: MIGAS 2000

e) Environmental Protection

Energy development will be implemented in support of environmentally sound and sustainable development. To achieve this, the environmental damage and the degradation of the eco-system that accompany energy development need to be continually decreased by decreasing negative environmental impacts, either local, or global, related to the production, transportation and end use of energy.

1.2.2 Energy Conservation Program (RIKEN)

In order to preserve the rapidly dwindling oil reserves of Indonesia, the government has decided to pursue national energy conservation with renewed vigor. The National Energy Conservation Program (RIKEN) defines a multi-sector approach for industry, transport and households. The plan was intended to provide guidelines to all concerned public and private sector entities on the implementation of the energy conservation policy. The Ministry also acts as the coordinating agency on energy conservation.

The shift away from natural crude oil resources is very much in line with the overall energy policy, which links energy resource diversification closely with energy conservation. Oil still dominates primary energy consumption. It remains a very important export commodity but internal demand has taken an increasing share of total production. Since 1989 exports have dropped slightly while local consumption has increased at 8 % per annum. Oil resources will be depleted within the next ten years if no new major discoveries are made.

Policy measures aim to formulate steps in managing the energy transition from basically oil-dependent systems to a new system in which the total non-oil energy mix will consist of natural gas, coal, geothermal and hydro power should dominate. BAPPENAS[4] projects a growth of 6.2 % in GDP annually, energy consumption 9% and electricity consumption 13%.

a) Primary Energy Consumption by Energy Resources

PLN extended its capacity from 3,032 MW in 1981 to over 20,553 MW in 1998/99. Besides PLN, the private sector is expected to play an increasingly important role in the supply of energy. In 1998/99 the non PLN and private power sector reached a total installed capacity of around 15,000 MW, which represents 43 % of Indonesia's total installed capacity. Promising renewable energy sources are mini-hydro, mini-geothermal, biomass-based power systems, biomass cogeneration and solar energy systems.

Table 1-4: Primary Energy Consumption by Energy Resources (Unit: 1000BOE[5])

Type of Energy	1995	1996	1997	1998	1999
Oil	290,013.0	304,006.2	342,845.9	333,534.5	352,357.2
Natural Gas	134,318.5	145,407.2	150,810.0	144,026.0	160,222.8
Coal	40,727.6	56,199.6	52,704.2	57,846.8	45,359.7
Hydro	26,404.6	27,117.4	20,637.4	26,912.8	27,979.9
Geothermal	4,200.0	4,545.3	5,424.1	7,435.2	7,522.0
Total	495,663.8	537,275.7	572,471.6	568,719.3	593,441.6

Data Source: Directorate General Oil and Gas, MME

b) General New and Renewable Energy Policies

[4] BAPPENAS (National Economic Development Agency - Bureau for Electricity, Energy Development and Mining): it prioritizes renewable energy projects, special rural electrification projects. It also determines (level of) government support, and appoints government project partners.

[5] Barrels of Oil Equivalent

Renewable energy policy is a part of national energy policy particularly on energy diversification policy. New and renewable energy technologies can basically be divided into grid-connected and stand-alone, isolated, or decentralized power supplies.

To date, the utilization of renewable energy are still small compared to national energy demand, so that renewable energy development has to be supported to contribute significantly to national energy supply mix. Thus, PLN generally appears prepared to include proven renewable energy technologies in its charter, provided that there is centralized power generation and a subsequent power distribution network. Hydro and mini-hydro, geothermal and mini-geothermal, large-scale grid-connected biomass and wind-based power generation may fall in its scope of interest.

Table 1-5: Fuel Products Pricing (Rp/liter)

	May 1998	October 2000	June 2001	January 2002
Gasoline	1,000 Rp.	1,150 Rp.	1,450 Rp.	1,550 Rp.
Kerosene	280 Rp.	350 Rp.	400 Rp.	600 Rp.
Automotive Diesel Oil	550 Rp.	600 Rp.	900 Rp.	1,150 Rp.
Industrial Diesel Oil	500 Rp.	550 Rp.	1,000 Rp.	1,100 Rp.
Bunker Fuel Oil	350 Rp.	400 Rp.	900 Rp.	925 Rp.

Source: The Jakarta Post 1 October 2000, "Recent Economic Report" Embassy of the USA

1.2.3 Comparison of Unit Generation Cost of the Kotapanjang with Other Power Plants

Figure 3-5 indicates the type-wise unit generation cost of the Kotapanjang HEPP and other PLN's power stations. The unit generation cost of the Kotapanjang HEPP is higher than average of hydro, however still substantially lower than other generation type. Before the project implementation, the Riau province completely depended their energy source on diesel power plant, of which generation cost was considerably higher than PLN's average generation cost.

Table 1-6: Comparison of Unit Generation Cost (Rupiah/kWh)

	Hydro	Steam	Diesel	Gas Turbine	Combined Cycle	PLN Average	Kotapanjang
1995	20.13	55.87	157.05	131.52	69.76	74.82	-
1996	17.19	56.8	156.11	179.94	69.49	68.37	-
1997	18.39	69.47	186.16	253.11	95.73	87.43	-
1998	20.03	106.93	211.5	247.91	233.02	152.2	-
1999	29.55	116.08	221.36	224.38	192.63	146.79	58.96
2000	32.61	109.79	231.92	324.29	204.51	148.33	62.64
2001	-	-	-	-	-	-	60.74

Source: PLN Statistics 1995 - 2000

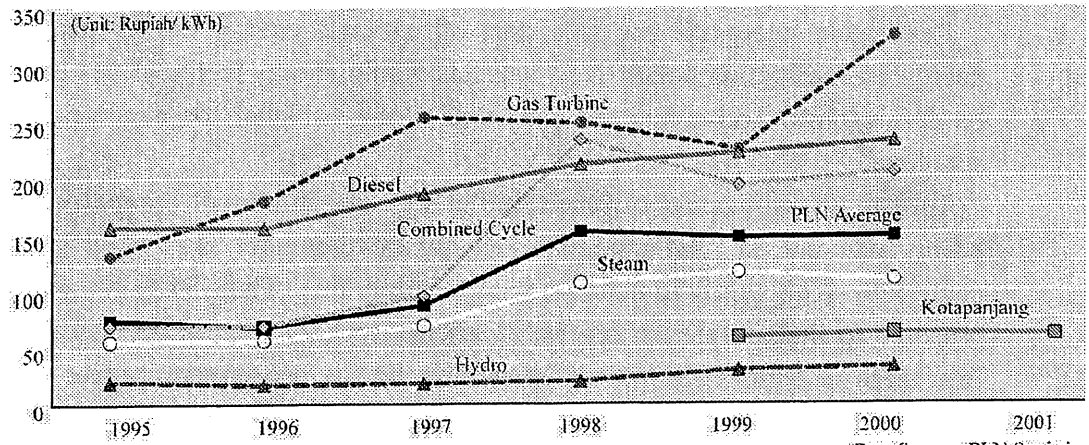

Figure 1-1: Comparison of Unit Generation Cost Data Source: PLN Statistic

1.2.4 General Electricity Supply Condition of the Region III

Details will be mentioned in the section 5.4.1 and 5.4.2 of this report

1.2.5 Generation, Transmission, Substation Construction Plan in South Sumatra

Details will be mentioned in the section 5.4.3 of this report

2.1 Project Scope

2.1.1 Decision of the Dam Scale

At the time of Feasibility Study of JICA Team in 1982-1984, an optimization study was executed based on the scale of the proposed dam, annual generated energy and construction cost was calculated for three cases as shown in Table 2-1. The study took into account the height of the dam, operating hours, effective water storage capacity and effective depth, and the each case was evaluated on the basis of a cost-benefit analysis. According to the analysis, the case of HWL[*6] 100 m was the economically optimum. However, considering a part of Pangkalan Kotabaru (elevation of 88.2 m - 91.5 m) with population of 8,572 and that the Buddhist temple remains (Muara Takus) lie at an elevation of 86.25 m the proposed HWL was set at 85 m.

Table 2-1: Comparison of Dam Scales Studied at Feasibility Study

	HWL= 76 m	HWL= 85 m	HWL= 100 m
Maximum Output (kW)	90,000	111,000	160,000
Maximum Discharge (m^3/sec)	348	348	348
Effective Head (m)	30.7	38.1	54.4
Annual Generated Energy (kWh)	393 x 10^6	495 x 10^6	697 x 10^6
Construction Cost (10^3 US$)	155,447	190,194	268,796
Construction Cost per kW (US$)	1,727	1,713	1,680
Construction Cost per kWh (US$)	0.40	0.38	0.39
Benefit – Cost (B-C)	1.43	1.47	1.47
Benefit / Cost (B/C)	9,534	12,551	17,923

Data Source: JICA Feasibility Study, 1984

2.1.2 Comparison of Original Project Scope and Actual Scope

Originally envisaged project scope at OECF appraisal was actualized without major deviation. In dealing with actual site conditions, following modifications were made during the implementation of the project.

a) Modification of Transmission Line Route: Transmission line between Kotapanjang switchyard and Pekanbaru substation was 69.3 km in original plan. However, as Pekanbaru substation was relocated toward Kotapanjang taking into consideration of actual site condition, the line length was reduced to 64.4 km.

b) Change in Design of Relocation Road: Alignment of national road at resettlement area was carried out with modification of gradient of slope and deck plats. These

[6] HWL: Highest Water Level

minor modifications were made taking into actual topography of the project site.

c) Cancellation of Riverbank Reinforcement at Muara Takus Temple: At appraisal, reinforcement of the slope along the riverbank at the western part of the temple was envisaged, in order to avoid land sliding due to reservoir water. However, as a result of site geographical inspection and slope stability calculation, the riverbank was judged as vary stable. Thus protection work was not carried out. At present, the riverbank slope is self-supported and there is no sign of landslide.

2.2 Project Implementation Period

2.2.1 Comparison of Original Schedule and Actual Implementation

The construction/ installation of power station, transmission lines, substations, and relocation road was completed in September 1999, a delay of as many as 33 months, given the original completion date of November 1996. The consulting services for the project was completed in October 1999 as against the scheduled completion date of November 1997, a delay of about 23 months.

Table 2-2: Comparison of the Original Schedule and Actual Period

Item	Original Schedule (At the time of OECF appraisal)	Actual Period
<IP-358>		
Loan Agreement	Jan 1990	Dec 1990
Consulting services	Oct 1990 to Nov 1997	Mar 1991 to Oct 1999
Civil works	Dec 1990 to Oct 1996	Oct 1992 to Nov 1997
Land acquisition and resettlement	May 1990 to May 1996	Started in May 1990 but completion date was unknown
<IP-374>		
Loan Agreement	Oct 1991	Sep 191
Consulting services	Jul 1991 to Nov 1996	Sep 1991 to Aug 1999
<HPP>		
Installment of communication system	Oct 1991 to Feb 1993	Oct 1997 to Sep 1999
Metal works	Jan 1992 to May 1996	Aug 1993 to Nov 1996
Installment of equipment	Oct 1991 to Nov 1996	Sep 1993 to Nov 1998
Relocation road and bridges	Oct 1991 to Nov 1995	Feb 1993 to Mar 1997
<Transmission Lines>		
Procurement of equipment of transmission line	Nov 1991 to Apr 1994	Apr 1994 to Jun 1997
Installation, civil works	Nov 1991 to Dec 1994	Apr 1994 to Nov 1997

Data Source: Project Completion Report October 2001, PLN

2.2.2 Reason for Delay/ Early Completion

The completion delay was brought about by the following factors:

a) Completion Delay of Installation of Generating Equipments (24 months delay)

Turbines installation work commenced on 25th September 1993. The contractor has suffered several delays during the final stage of commissioning the units. Work

was also interrupted for 2 months and a half when the contractor evacuated the site to protect his work force from the smoke haze condition caused by the forest fires in Sumatra. The contractor's work force returned to the site at the beginning of December 1997 and runner blade trouble occurred during over speed test of the Unit 1 on 28th January 1998 and completed the all units on 21st November 1998.

b) Completion Delay of Installation of the Substation Equipments (11 months delay)

Installation/ construction of substations works commenced on 1st April 1994. Originally the work should be completed in September 1996. However, actual completion of delivery of materials and necessary equipments were in August 1997 and supervision of erection work, which was delayed by progress of civil work of substation, was finally completed in October 1997. The delay was resulted from the contractor's insufficient capability for executing work. For example, i) the contractor did not mobilize construction machine such as wrecker crane fro steel structure, and ii) the contractor did not carried out the work in parallel with other substations, etc.

c) Completion Delay of Procurement of Transmission Line Materials (19 months delay)

Transmission line materials contract commenced on 1st April 1994 and the work should be competed by 30th November 1995. However, Lot IV contractor delayed much in design and fabrication of towers. As for tower material, many miss-fabrications were found after delivery to site. Therefore contractor transported equipment and tools for correction works from Japan and Jakarta to the site. This correction work was completed in the middle of June 1997, namely 19 months delay

d) Completion Delay of Relocation of National Road (24 months delay)

A relocation of national road commenced on 1st February 1993 and was scheduled to complete on 31st January 1995. However, due to design modification, additional excavation quantities and unforeseen conditions of land acquisition, actual completion was on 31st March 1997, a delay by 24 months.

2.3 Project Costs

2.3.1 Comparison of Originally Estimated and Actual Expenditure

At the time of the project appraisal report total construction cost was estimated at 36,499 million yen equivalent, comprising 6,948 million yen in foreign currency and 8,933 million yen equivalent in local currency. Actual expenditure of 29,898 million yen equivalent was 18% lower than the estimated figure.

Table 2-3: Original Estimate and Actual Expenditure of the IP-358 (Unit: Mil Yen)

	Originally Estimated Cost						Actual Expenditure					
	Foreign		Local		Total		Foreign		Local		Total	
1990	174	174	950	N.A	1,124	N.A	0	(0)	0	(0)	0	(0)
1991	1,813	1,813	2,121	N.A	3,934	N.A	103	(103)	156	(35)	259	(138)
1992	974	974	1,461	N.A	2,435	N.A	1,295	(1,295)	2,682	(535)	3,977	(1,830)
1993	1,268	1,268	1,335	N.A	2,603	N.A	1,073	(1,073)	1,854	(690)	2,927	(1,763)
1994	1,323	1,323	1,443	N.A	2,766	N.A	969	(969)	1,575	(920)	2,544	(1,889)
1995	714	714	786	N.A	1,500	N.A	446	(446)	1,116	(830)	1,562	(1,276)
1996	659	659	832	N.A	1,491	N.A	444	(444)	716	(575)	1,160	(1,019)
1997	23	23	5	N.A	28	N.A	497	(497)	509	(374)	1,006	(871)
1998							1,298	(1,298)	274	(87)	1,572	(1,385)
1999							358	(358)	143	(97)	501	(455)
Total	6,948	6,948	8,933	5,552	15,881	12,500	6,483	(6,483)	9,025	(4,143)	15,508	(10,626)

Data Source: Project Completion Report October 2001, PLN

Table 2-4: Original Estimate and Actual Expenditure of the IP-374 (Unit: Mil Yen)

	Originally Estimated Cost						Actual Expenditure					
	Foreign		Local		Total		Foreign		Local		Total	
1991	329	329	67	(N.A)	396	(N.A)	0	(0)	24	(0)	24	(0)
1992	2,981	2,981	1,925	(N.A)	4,906	(N.A)	235	(235)	310	(256)	545	(491)
1993	3,590	3,590	1,556	(N.A)	5,146	(N.A)	1,129	(1,129)	1,152	(654)	2,281	(1,783)
1994	4,015	4,015	1,210	(N.A)	5,225	(N.A)	454	(454)	1,310	(984)	1,764	(1,438)
1995	2,787	2,787	1,009	(N.A)	3,796	(N.A)	1,151	(1,151)	590	(403)	1,741	(1,554)
1996	487	487	268	(N.A)	1,491	(N.A)	2,468	(2,468)	2,278	(1,822)	4,746	(4,290)
1997	324	324	70	(N.A)	394	(N.A)	627	(627)	730	(588)	1,357	(1,215)
1998							721	(721)	138	(58)	859	(779)
1999							575	(575)	498	(59)	1,073	(634)
Total	14,513	14,513	6,105	3,012	21,354	17,525	7,360	(7,360)	7,030	(4,824)	14,390	(12,184)

Data Source: Project Completion Report October 2001, PLN

Table 2-5: Original Estimate and Actual Expenditure of the IP-358 and 374 (Unit: Mil Yen)

	Originally Estimated Cost						Actual Expenditure					
	Foreign		Local		Total		Foreign		Local		Total	
1990	174	(174	950	(N.A)	1,124	(N.A)	0	(0)	0	(0)	0	(0)
1991	2,142	(2,142	2,188	(N.A)	4,330	(N.A)	103	(103)	180	(35)	283	(138)
1992	3,955	(3,955	3,386	(N.A)	7,341	(N.A)	1,530	(1,530)	2,992	(791)	4,522	(2,321)
1993	4,858	(4,858	2,891	(N.A)	7,749	(N.A)	2,202	(2,202)	3,006	(1,344)	5,208	(3,546)
1994	5,338	(5,338	2,653	(N.A)	7,991	(N.A)	1,423	(1,423)	2,885	(1,904)	4,308	(3,327)
1995	3,501	(3,501	1,795	(N.A)	5,296	(N.A)	1,597	(1,597)	1,706	(1,233)	3,303	(2,830)
1996	1,146	(1,146	1,100	(N.A)	2,982	(N.A)	2,912	(2,912)	2,994	(2,397)	5,906	(5,309)
1997	347	(347	75	(N.A)	422	(N.A)	1,124	(1,124)	1,239	(962)	2,363	(2,086)
1998	0	(0	0		0		2,019	(2,019)	412	(145)	2,431	(2,164)
1999	0	(0	0		0		933	(933)	641	(156)	1,574	(1,089)
Total	21,461	(21,461	15,038	(8,564	37,235	30,025	13,843	(13,843)	16,055	(8,967)	29,898	(22,810)

Data Source: Project Completion Report October 2001, PLN

2.3.2 Reason for Discrepancies

Considerable cost saving of 6,601 million yen equivalent, or 18% lower than appraisal estimate was resulted from the following reasons; i) decrease in the contract tender price arising for the intense competition, ii) appreciation of Japanese yen vis-à-vis Indonesian rupiah[*7] and US dollar[8]. Main reason of cost savings was considered as lower tender price resulted from keen competition. As shown in the following table, actual tender prices were 29.4% or 7,585 million yen lower than original estimate. In addition, most US dollar portion costs was settled by Japanese yen at the time of yen's strongest period (1.0 US dollar= 85 Japanese yen).

[7] 0.08 - 0.068 yen/rupiah at appraisal, and 0.066 - 0.010 yen/ rupiah of actual

[8] 130 yen/ $ - 145 yen/$ at appraisal, and 140 – 84 yen/ US$ of actual

These considerable cost saving was, to some extent, offset by the price inflation in Indonesia, increase in project scope[*9], and extension of project implementation period. Even though, total project cost was lower than appraisal estimate.

Table2-6: Cost Saving by Intense Competition at Competitive Bidding (Mil Yen)

	A: Original	B: Actual	Difference (B-A)	Ratio (B/A)
Lot I Civil Works	10,262	8,190	-2,072	79.81%
Lot II Metal Works	1,899	1,149	-750	60.51%
A & B Generation	6,296	4,330	-1,966	68.77%
Switchyard equipment	930	400	-530	43.01%
Relocation Road	2,763	2,063	-700	74.67%
Transmission Line Materials	1,541	843	-698	54.70%
Substation Equipments	1,287	607	-680	47.16%
Transmission Line Civil Works	515	419	-96	81.36%
Substations Civil Works	304	211	-93	69.41%
Total	25,797	18,212	-7,585	70.60%

Data Source: Project Completion Report October 2001, PLN

Appendix: Data Sheet for "2. Efficiency in Implementation"

Table 2A-1: IP- 358 Originally Estimated Cost (by Item) (Unit: Million Yen)

Breakdown of Cost Item	Originally Estimated Cost			Actual Expenditure		
	Foreign	Local	Total	Foreign	Local	Total
Civil works	5,207 (5,207)	5,055 (5,055)	10,262 (10,262)	4,916 (4,916)	3,799 (3,797)	8715 (10,262)
Consulting service	1,532 (1,532)	295 (295)	1,827 (1,827)	1,567 (1,567)	381 (345)	1,948 (1,827)
Physical Contingency	209 (209)	202 (202)	411 (411)	0 (0)	0 (0)	0 (0)
Tax	0 (0)	1,068 (0)	1,068 (0)	0 (0)	1,066 (0)	1,066 (0)
Land acquisition	0 (0)	2,313 (0)	2,313 (0)	0 (0)	3,779 (0)	3,779 (0)
Total	6,948 (6,948)	8,933 (5,552)	15,881 (12,500)	6,483 (6,483)	9,025 (4,142)	15,881 (12,500)

( ) out of which ODA Loan Portion Data Source: Project Completion Report October 2001, PLN

Exchange Rate: Appraisal Rp 1= ¥ 0.08 (as of March, 1990)
Actual Rp 1= ¥ 0.069- 0.010 (monthly average exchange rate at SOP issued)

Table 2A-2: IP- 374 Originally Estimated Cost (by Item)

Breakdown of Cost Item	Originally Estimated Cost			Actual Expenditure		
	Foreign	Local	Total	Foreign	Local	Total
Metal work	1,615 (1,615)	284 (n.a)	1,899 (n.a)	849 (849)	241 (241)	1,090 (1,090)
HPP equipment	5,920 (5,920)	376 (n.a)	6,296 (n.a)	3,509 (3,509)	588 (588)	4,097 (4,097)
Switchyard equipment	856 (856)	74 (n.a)	930 (n.a)	332 (930)	56 (56)	388 (388)
Communication equipment	22 (22)	1 (n.a)	23 (n.a)	135 (135)	41 (41)	176 (176)
Relocation road & bridges	1,527 (1,527)	1,236 (n.a)	2,763 (n.a)	0 (0)	3,750 (2,964)	3,750 (2,964)
Transmission materials	1,541 (1,541)	0 (n.a)	1,541 (n.a)	807 (807)	7 (7)	814 (814)
Substation equipment	1,287 (1,287)	0 (n.a)	1,287 (n.a)	564 (564)	4 (4)	568 (568)
Installment	0 (0)	515 (n.a)	515 (n.a)	0 (0)	654 (621)	654 (621)
Substation civil works	0 (0)	304 (n.a)	304 (n.a)	0 (0)	136 (129)	136 (129)
Consulting service	1,061 (1,061)	259 (n.a)	1,320 (n.a)	1,164 (1,164)	190 (173)	1,354 (1,337)
Physical contingency	684 (684)	327 (n.a)	1,011 (n.a)	0 (0)	0 (0)	0 (0)
Tax	0 (0)	1,556 (n.a)	1,556 (n.a)	0 (0)	1,303 (0)	1,303 (0)
Land acquisition	0 (0)	1,173 (n.a)	1,173 (n.a)	0 (0)	60 (0)	60 (0)
Total	14,513 (14,153)	6,105 (3,012)	20,618 (17,525)	14,513 (14,153)	7,030 (4,824)	14,390 (12,184)

( ) out of which ODA Loan Portion Data Source: Project Completion Report October 2001, PLN

Exchange Rate: Appraisal Rp 1= ¥ 0.068 as of April, 1991
Actual Rp 1= ¥ 0.069- 0.010 (monthly average exchange rate at SOP issued)

[9] Additional equipments of flood forecasting system were procured/ installed under the project. In addition, change in alignment of relocation road was required at resettlement area.

3.1 Operational Performance of the Power Station

The powerhouse of the Kotapanjang HEPP was built at the downstream end of the dam on the left bank, with the main building of 80.3 m in length, 35.6 m in width and 43.2 m in height. Three unit of vertical shaft Kaplan turbines each having rated capacity of 38.0 MW were installed in the powerhouse. The turbine discharge and effective head per turbine is 116 m^3/sec and 38.1 m, respectively. Three sets of 45,000 kVA generators were also installed.

Water for generation is taken from an upstream reservoir through three sets of intakes and penstocks. The penstocks line starts at intake portion of the upstream dam surface and terminates at the entrance of the turbines. The amount of water intake per one intake and discharge capacity of a penstock is 116 m^3/sec.

Commencement of commercial operation of the Unit 1, 2, and 3 were 21st November 1998, 20th April 1998, and 28th February 1998, respectively.

3.1.1 Gross Energy Production and Plant Load Factor

Table 3-1 indicates year-wise gross energy production*1 of the Kotapanjang HEPP. At the time of the appraisal, target level for annual gross energy production of the power station was established at 542,000 MWh. However, the power station has established the revised target level, which was prepared in 1998 with reflecting the actual demand.

Table 3-1: Year-wise Gross Energy Production of the Kotapanjang HEPP(Unit: MWh)

		1998	1999	2000	2001	2002*
Original Target Level**		542,000.0	542,000.0	542,000.0	542,000.0	542,000.0
Revised Target Level***		308,540.0	392,260.0	412,346.0	472,872.0	542,000.0
Actual Operation	Unit 1	28,825.5	160,343.8	132,799.8	102,131.4	46,943.1
	Unit 2	135,048.2	120,264.0	138,994.5	161,088.4	46,185.0
	Unit 3	137,574.9	112,615.4	140,570.4	220,497.0	59,406.0
	Total	301,448.6	393,223.2	412,364.7	483,716.8	153,164.1

* Actual figures in 2002 are from January 1st to March 31st only

Data Source: Kotapanjang HEPP

** Quoted from the JBIC appraisal report (October 1990)

*** Target level of 1998 - 1999 is quoted from "Energy Balance Sumbar Riau System Year 1998 up to 2001", target level of 2000 - 2002 is quoted form "Estimation of Energy Demand & Generated Energy Sumbar- Riau-Jambi- Bengkulu System Year 2000 up to 2005" prepared by PLN UPB Sumbar- Riau

Detailed operational performance of the power station is shown in Table 3A-5 to 3A-8. As of today, the power station experienced 3 major outages. Two planned outages*2

[1] The total amount of electric energy produced by the generating units at a generating station or stations, measured at the generator terminals

[2] Removing equipment from service availability for inspection and/or general overhaul of major equipment. A planned

occurred to the Unit 2 and 3 in 1998. These outages were resulted from necessity of replacement of inferior grade nuts of the Units. Remaining one outage could be classify as forced outage[3], was occurred in 2001, due to malfunction of a circuit board of governor controller of the Unit 1. Since these troubles were happened during their warranty period, all the troubles were settled by the original contractors with their budget. Details of the troubles are shown below.

a) Replacement of Inferior Grade of Nuts for the Unit 2 and 3 (November 1998 – July 1999)

During the commissioning test of the Unit 1, or 28th January 1998, turbine runner piston and piston rod fastener failure occurred. Then following commissioning test was canceled for the investigation and restoration work of this problem. As a result of investigation, cause of the problem was found out to be miss assembling of the inferior grade nuts, and all the inferior grade nuts were replaced by proper grade nuts. In addition, the stud bolts were also replaced due to little damage on threads.

Since these inferior grade nuts were used also for the Unit 2 and 3, although both units had already commissioned, they were required to be shutdown for replacing nuts. Replacement of nuts and studs required dismantling of turbine as well as lifting out of runner on to the erection bay of the powerhouse. In case of the Unit 3, replacement work was started in November 1998 and ended in March 1998. After the completion of replacement works of the Unit 3, the Unit 2 was also shutdown in April 1999, and the work was completed in July 1999.

b) Damage of Governor Controller of the Unit 1 (July 2001 – December 2001)

The Kotapanjang HEPP adopted electric governor in the turbine. An electric governor is used where water economy is more important, and a more sophisticated control is required to match output to load by controlling the flow of water to the turbine runner, and for shutting the turbine down.

On 2nd July 2001, energy output from the Unit 1 had suddenly become unstable. Subsequent to the trouble, a detail inspection was carried out by power station staffs. As a result of the inspection, they identified cause of trouble as malfunction of a circuit board of governor controller of the Unit 1, located in the control room. They found out the necessity of replacing the circuit board of the governor controller. Although the Unit itself had been kept in good condition, it could not operate at all, from that time to 4th December 2001.

The power station had to import the circuit board from Austria. An order form of the spare parts was sent to the original supplier from the power station via PLN Sector in Pekanbaru and North Sumatra Generation and Transmission Unit in Medan. However, since the staffs in the power station as well as personnel

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outage does not usually result in power supply failure, although planned outages during critical peak demand periods may place stress upon a system.

[3] The removal from service availability of a generating unit for emergency reasons or a condition in which the equipment is unavailable due to unanticipated failure.

concerned were not so familiar with these procedures, it took considerable time to obtain the circuit board.

3.1.2 Daily Operation Pattern of the Power Station

The Kotapanjang HEPP supplies generated electricity to the Sumbar- Riau System[*4]. Operation of the power station is carried out by the operation staffs of the power station in accordance with the allocation schedule. Allocation schedule of the power station is prepared by the PLN UPB (Unit Pengatur Beban)[*5] Sumbar- Riau. Every morning PLN UPB Sumbar- Riau received information about conditions of power stations and water level of reservoirs from respective power stations, which are located within Sumbar- Riau System. Then, based on the above-mentioned conditions and load demand forecast in the system, UPB instructs daily allocation schedule to each power station.

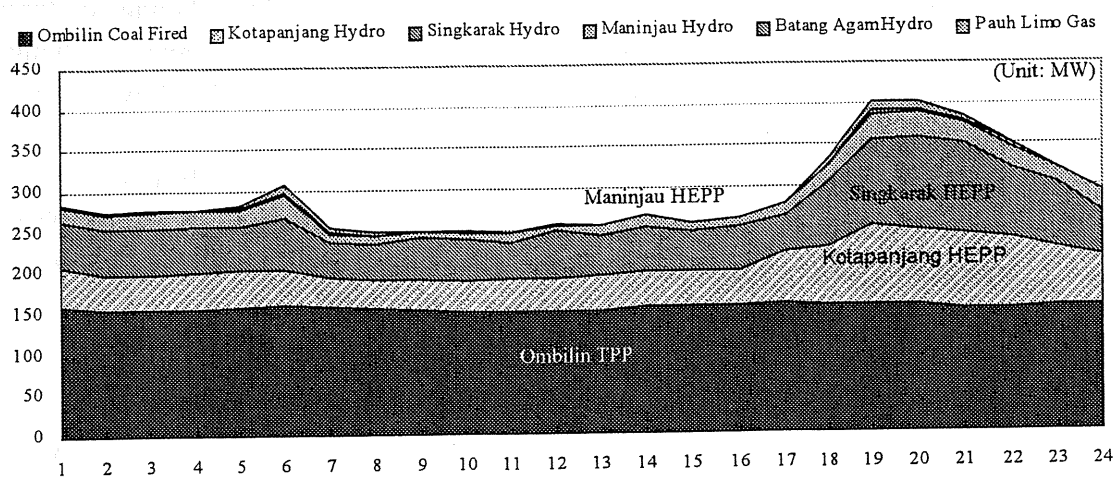

Figure 3-1: Typical Daily Load Curve of the Sumbar- Riau System
Data Source: PLN UPB Sumbar- Riau

Figure 3-1 is a typical daily load curve[*6] of the system. At present, there are seven power stations within the system. The largest power station, in terms of rated capacity, within the system is the Ombilin thermal power plant (TPP). The Ombilin TPP (2 x 100 MW) runs on coal, and is utilized for base load[7] facility. On the other hand, the hydroelectric power stations, namely the Kotapanjang, the Singkarak, the Maninjau, and Batang Agam, play a role of middle/peak load facility.

Since commissioning, the Kotapanjang HEPP has utilized for middle load facilities. Normally, three units are operated during the evening peak hour (18:00 - 23:30) and

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[4] A system of interconnected transmission lines and power stations that is managed so that the power stations are dispatched as needed to meet the requirements of the customers connected to the grid at various points. The Kotapanjang HEPP connected to the Sumbar- Riau System, which stretches two provinces, namely West Sumatra and Riau.

[5] Load dispatching unit of the Sumbar- Riau system.

[6] A curve of power versus time showing the level of a load for each time period covered. The horizontal axis is time and the vertical axis is load (kW).

[7] The minimum amount of power delivered or demanded over a given period at a constant rate. On a daily load curve this will be the constant bottom line demand for a group of customers.

outputted 70 - 114 MW of load, while one or two units are operated during off-peak time and outputted 20 - 70 MW of load.

3.1.3 Generation Cost

a) Breakdown of Generation Cost of the Kotapanjang HEPP

Table 3-2 shows item-wise generation cost of the Kotapanjang HEPP from 1998 to 2001. Most of the generation cost was occupied by depreciation of the asset. In 2001, the depreciation cost accounted for 74.3% of the total generation cost. Along with the rapid inflation of domestic price as well as depreciation of Indonesian rupiah, ordinal operation costs have increased considerably. However, since these costs occupied small part of the total generation cost, these cost increases have not so affected the unit generation cost.

Table 3-2: Generation Cost of Kotapanjang HEPP (Unit: 1,000 Rp.)

	1998	1999	2000	2001
Fuel and Lubricant	0.0	0.0	299.6	177.8
Material and Spare Parts	63,333.2	98,163.5	380,512.5	1,006,074.7
Payment to Subcontractor	39,953.6	123,271.6	379,394.0	2,757,715.8
Salary	425,811.6	765,637.6	969,353.9	1,074,999.0
Other	66,987.2	198,257.0	250,355.3	196,810.3
Administration	92,954.7	245,297.5	1,629,197.0	2,507,308.4
Depreciation	2,946,905.2	21,755,502.4	22,223,425.4	21,836,287.1
Total	3,635,945.6	23,186,129.8	25,832,537.8	29,379,373.1
Energy Production (MWh)	301,448.60	393,223.20	412,364.70	483,716.80
Generation Cost (Rp/kWh)	12.06	58.96	62.64	60.74

Data Source: PLN Sector Pekanbaru

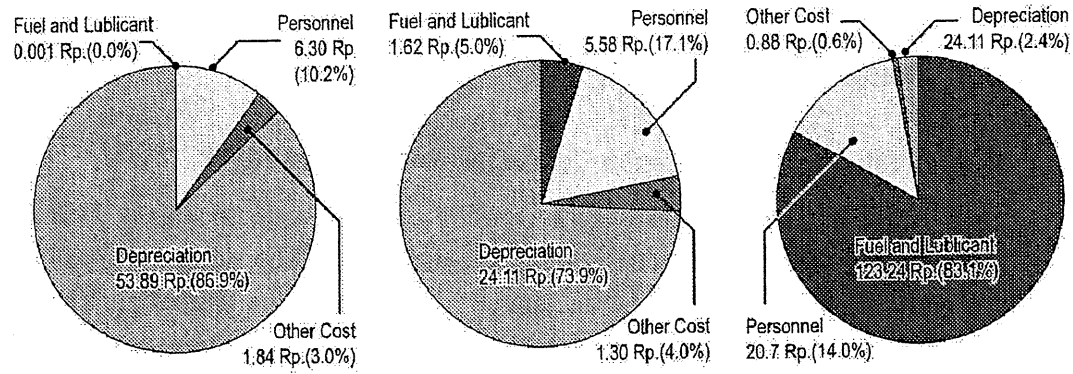
b) Proportion of Generation Cost

Figure 3-2 indicates the proportion of item-wise unit generation costs of PLN average[*8], PLN hydro average, and the Kotapanjang HEPP in 2000. Proportion of item-wise generation cost of the Kotapanjang HEPP indicates a similar picture of PLN hydro average. Depreciation occupied 86.9% of total generation cost in 2000. When the comparison is made between the Kotapanjang with PLN hydro average, in terms of depreciation cost per kWh, that of the former (53.89 rupiahs/ kWh) was considerably high than latter (24.11 rupiahs/ kWh). The reasons of this could be explained as follows.

In the case of the Kotapanjang HEPP, a power station was developed with a dam. And the water of the artificial reservoir is used only for power generation. Accordingly, depreciation of dam is completely appropriated in the generation cost. Some hydro power stations utilize water from natural lake. In addition, some hydro power stations intake water from existing dam which was originally constructed for

[8] Including all power stations operated by PLN, such as oil/coal/gas fired thermal, geothermal, combined cycle, hydro, diesel generator, and biomass power plant.

irrigation, water supply, flood control etc. In these cases, depreciation cost of dam is allocated not only generation cost but also other purpose.



Data Source: PLN Statistic 2001, Kotapanjang HEPP

Figure 3-2: Comparison of Item-wise Generation Cost per kWh (Year 2000)

3.2 Water Availability at Kotapanjang Reservoir

The dam site is located approximately 10 km downstream of the confluence of the Kampar Kanan and Mahat Rivers. The dam is 58 m high with a crest length of 257 m and a volume of approximately 301,300 m^3 to suit the topography and geology. The reservoir created by the dam has an active storage capacity[*9] of 1,040 million m^3, which regulates the annual inflow at the site. A maximum of 348 m^3/sec of water is conveyed through three penstocks to a powerhouse.

3.2.1 Rainfall at the Project Site

The project area is located in the tropical zone where monsoon winds, heavy rainfall and high humidity with little variation in temperature dominate the climate. By these monsoon winds, there are distinct seasons, the wet season with the northeast monsoon from November to May and the dry season with Southwest monsoon from June to October. During the wet season, the moist northeast monsoon causes heavy rainfalls on east slope of the Barisan Mountains where the project area is located. On the other hand, rainfall decreases during the dry season with Southwest monsoon, since the project area is located in the lee side of this monsoon wind by the Barisan Mountains.

3.2.2 Water Inflow and Outflow

Table 3-3 indicates water inflow to the Kotapanjang dam. At the time of the feasibility study, annual average discharge at the dam site was estimated to be 173.5 m^3/sec (1971-1981).

[9] The total amount of reservoir capacity normally available for release from a reservoir below the maximum storage level. It is total or reservoir capacity minus dead storage capacity. More specifically, it is the volume of water between the outlet works and the spillway crest.

Table 3-3: Water Inflow to the Kotapanjang Dam (Unit: m^3/sec)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
Actual	1998	-	-	-	-	-	-	-	-	335.9	134.4	101.3	335.9	134.4
	1999	427.0	324.3	225.9	97.4	136.1	93.0	113.2	131.6	218.8	355.7	270.6	318.9	225.8
	2000	538.9	232.5	153.9	170.2	102.0	111.2	59.6	129.1	55.6	66.1	264.3	176.5	170.9
	2001	305.6	294.1	156.2	250.7	164.7	106.1	80.0	89.0	101.2	113.0	164.0	200.1	168.7
	2002	220.9	232.5	-	-	-	-	-	-	-	-	-	-	226.7
Estimate*	Very Wet	310.6	278.0	278.8	377.8	245.2	154.1	100.5	78.2	112.1	175.4	294.4	410.6	234.3
	Wet	368.2	307.0	320.7	265.7	207.8	132.1	82.3	123.7	140.9	155.5	251.9	280.4	219.2
	Normal	331.2	193.8	263.2	195.8	240.4	79.7	73.3	82.0	151.5	225.8	337.4	334.3	209.4
	Dry	294.9	330.3	240.6	202.5	154.6	84.2	95.9	60.8	79.1	121.2	292.0	359.9	192.2
	Very Dry	269.4	159.3	172.8	174.0	191.8	127.6	76.1	56.0	103.5	122.6	188.3	237.1	156.6

* Quoted from "Study on Kotapanjang Hydroelectric Power Plant and Associated Transmission Project Final Report": PT. Bita Bina Semesta May 2001. The data is based on the hydrological statistic of Kampar River, observed from 1977 to 1995 at Kotapanjang

Data Source: Kotapanjang HEPP

Table 3-4 indicates break down of water outflow from the reservoir. During 1999 and 2000, since there was plentiful inflow into the reservoir, substantial water was discharged from the spillway without contributing energy production. However, the amount of inflow during 2001 and 2002 was at the normal level and water has fully utilized power generation alone.

Table 3-4: Water Outflow from the Reservoir (Unit: m^3/sec)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1998	Turbine Discharge	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	Discarded Flow	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	Total Out Flow	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	145.5	143	138.9	136.5
1999	Turbine Discharge	123.61	147.82	137.27	138.	136.5	135.3	106.8	79.2	203.8	167.0	144.1	123.9
	Discarded Flow	247.3	185.6	51.4	0	0	0	0	0	0	222.6	142.3	136.7
	Total Out Flow	370.9	333.4	188.7	138.4	136.5	135.3	106.8	79.2	203.8	389.6	286.4	260.6
2000	Turbine Discharge	162.7	226.8	134.0	169.5	156.8	138.8	92.4	132.7	113.2	98.7	127.9	170.8
	Discarded Flow	353.9	86.6	0	0	0	0	0	0	0	0	0	0
	Total Out Flow	516.6	313.4	134.0	169.4	156.8	138.8	92.4	132.7	113.2	98.7	127.9	170.8
2001	Turbine Discharge	182	264.8	207.5	156.7	245.3	178.3	126.1	137.3	106.4	88.1	134.6	207.5
	Discarded Flow	0	0	0	0	0	0	0	0	0	0	0	0
	Total Out Flow	182	264.8	207.5	156.7	245.3	178.3	126.1	137.3	106.4	88.1	134.6	207.5
2002	Turbine Discharge	220.9	232.5										
	Discarded Flow	0	0										
	Total Out Flow	220.9	232.5										

Data Source: Kotapanjang HEPP

3.2.3 Water Level of the Reservoir

Figure 3-3 illustrates Rule Curve[*10] and actual water level of the reservoir. Water discharge from the reservoir is decided by the PLN UPB Sumbar- Riau (Load Dispatch Center), based on the electricity demand and the rule curve. Operation of spillway gate and water intake for the power station is carried out by the power station staffs as per Standard Operation Procedures (SOP), which are written in "Reservoir Operation Manual" and "Spillway Gate Operation Manual" prepared by the consultant.

[10] Water levels, represented graphically as curves, that guide reservoir operations. A curve indicating how a reservoir is to be operated under specific conditions to obtain best or predetermined results.

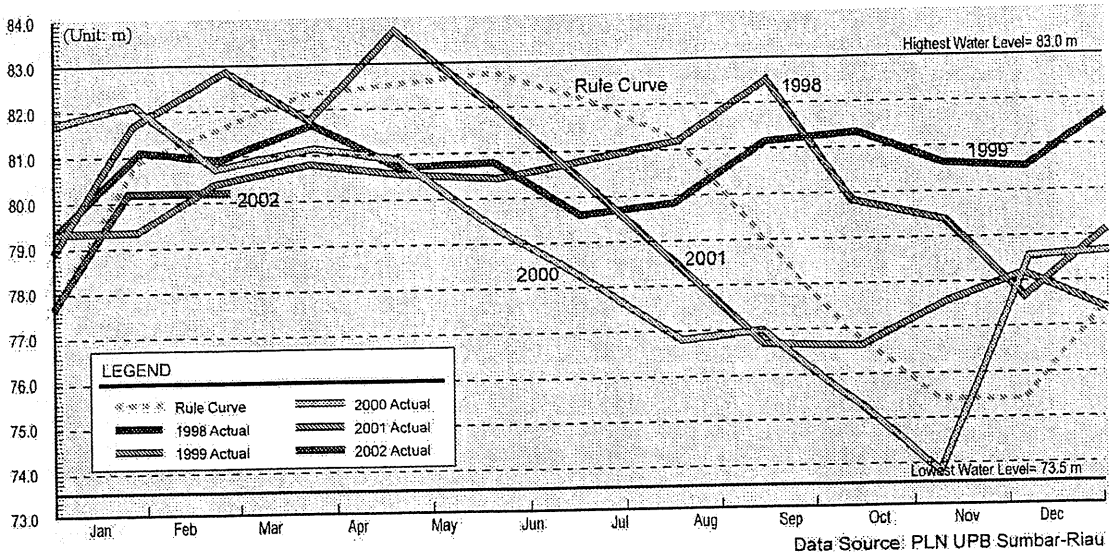


Figure 3-3: Ideal Rule Curve and Actual Water Level of the Dam

If water in the reservoir is below +83.00 m, water is utilized only for generation under. If water in the reservoir is above +83.00 m, besides inflow is above 1,000 m^3/sec the spillway gates are kept open, in order to avoid flooding of upstream. A water level difference of 2.00 m (+85.00 m minus +83.00 m) with the volume of 216 million m^3 is used for accommodating space of the surplus inflow during floods or during wet season.

Table3-5: Relation between Reservoir Water Level and Reservoir Volume

	Reservoir Water Level	Reservoir Volume
1. Highest reservoir water level	+85.000 m	1,545 million m^3
2. Highest reservoir water level for generation	+83.000 m	1,329 million m^3
3. Normal reservoir water level	+80.600 m	1,058 million m^3
4. Lowest reservoir water level for generation	+73.500 m	517 million m^3

Source: Reservoir Operation Manual

After the completion of the dam, water flow of down stream of the dam has completely relied on out flow from the dam. Thus even the water level is lower than the rule curve, the dam is required discharging certain amount of water.

3.2.4 Loss of Electricity due to Flood Threatening

During 1999 to 2000, PLN Sector Pekanbaru, as operator of the Kotapanjang HEPP, implemented four times operation of spillway gates out of SOP, with 7 days operation each, in order to fulfill request of representatives of Pangkalan Kotabaru residents and or Public Works Department at Pangkalan Kotabaru due to flood threatening (see Figure 3-7 and Table 3-9). In addition to the above, spill way gates were opened during the floods on January 6th 1998 and 2nd February 1998*[11] at Pangkalan Kotabaru (detail will be mentioned in section 4.5), in accordance with the SOP.

[11] During the floods on January 6th 1998 and 2nd February 1998, reservoir water levels were +83.420 m and +83.150 m and inflow of 3,576 m^3/sec and 3,456 m^3/sec, respectively.

Table 3-6: Lost of electricity due to Flood Threatening

Period	Water Level (m)	Inflow (m^3/s)	Discarded Discharge (m^3/s)	Request from
14th - 20th January 1999	+81.200 m	1,009.40	3,147.60	Representative of Residents
7th - 13th February 1999	+81.200 m	674.00	3,818,85	Public Works
8th - 14th January 2000	+82.760 m	795.80	3,728.10	Representative of Residents
1st - 7th February 2000	+82.140 m	574.19	2,137.08	Representative of Residents
Total			12,831.63	

Source: "A study for Mitigation of Annual Flood Impacts" Final Report, TEPCO and P.T. Modulatama Intikreasi

As shown in Table 3-6, 12,831.63 m3/sec of water was discharged from spillway gates due to flood threatening. According to the Sector Pekanbaru's estimation, 100.88 GWh of electricity or 27,238 billion rupiahs*[12] was lost, due to flood threatening. However, since then no one has requested opening of spillway gates. And water in the reservoir has fully utilized power generation.

3.3 Operational Performance of the Transmission Lines and the Substations

Under the project, in order to convey the electricity originate from the Kotapanjang HEPP to the major power consumption area in Riau Province, two substations were constructed in the outskirts of Pekanbaru and near the town of Bangkinang. Besides, existing Payakumbuh substation in West Sumatra was extended for receiving electricity from the Kotapanjang HEPP and for transmitting electricity to West Sumatra Province. Moreover, the double circuit 150 kV transmission lines were constructed among the above-mentioned substations and switchyard of the Kotapanjang HEPP.

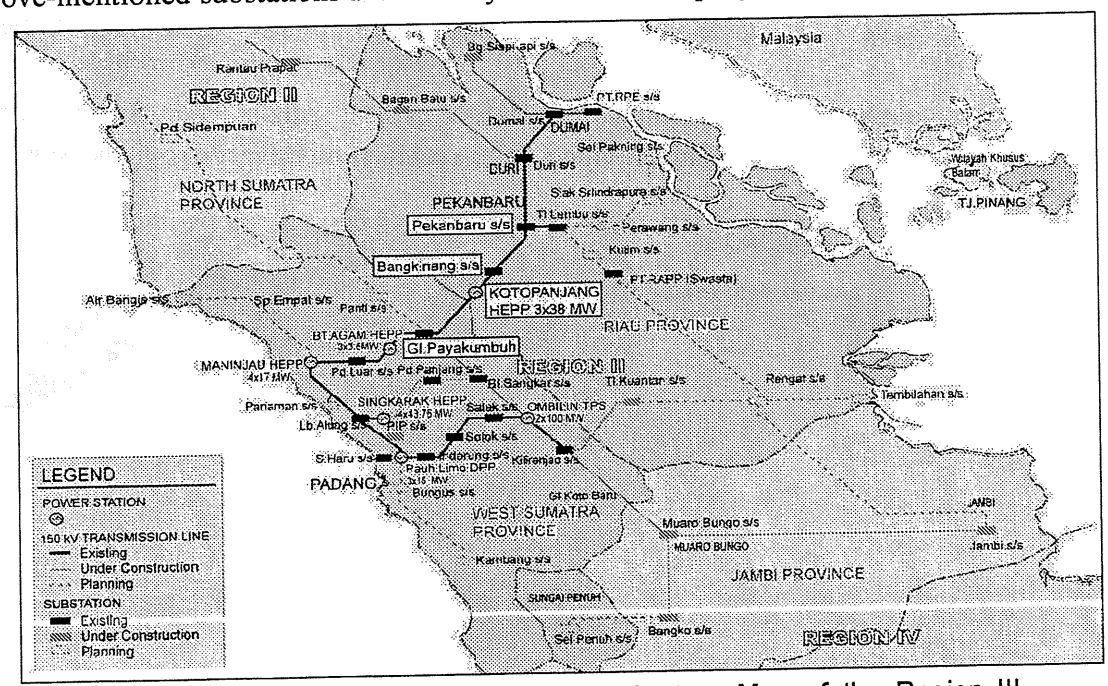


Figure 3-4: 150 kV Transmission System Map of the Region III

Original Map was prepared by PLN Region III

[12] Selling unit price of 1 kWh= 2.70 rupiahs

3.3.1 Development of Grid Transmission System in Region III

At present, Sumatra Island has three different 150 kV grid transmission systems, namely i) North Sumatra System (located in North Sumatra province and Ache special district), ii) Sumbar- Riau System (located in West Sumatra province and Riau province), iii) South Sumatra System (located in Lampung province and South Sumatra province). Before the project implementation, while West Sumatra had well developed grid transmission system and medium-scale power stations, power supply in the Riau province completely depended on the isolated diesel power plants (see Figure 3-5).

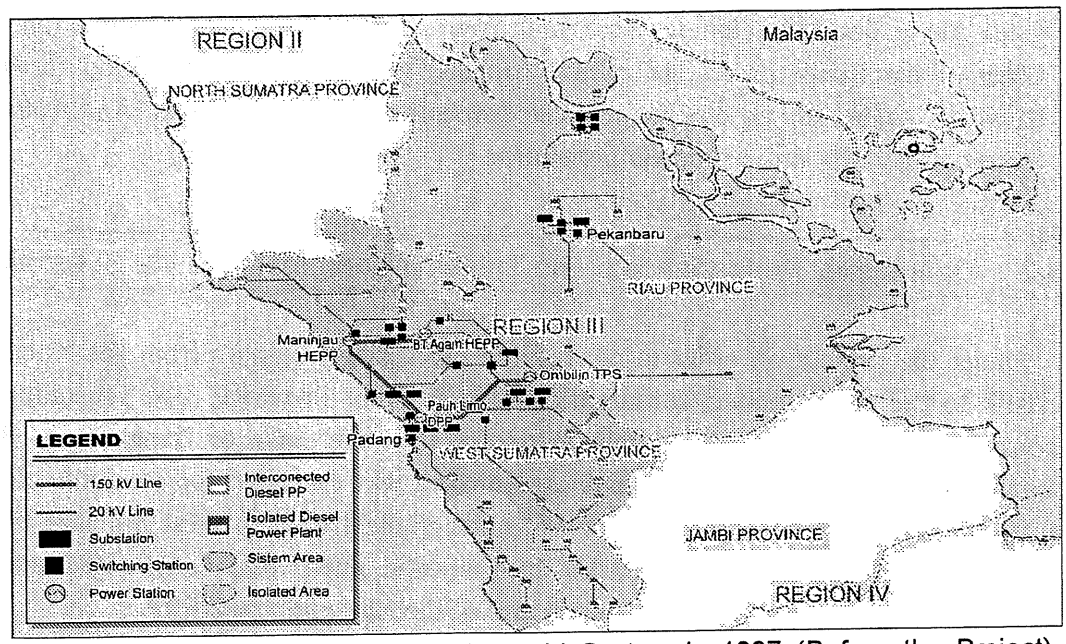


Figure 3-5: Supply Area by the Grid System in 1997 (Before the Project)
Base Map was prepared by PLN Region III

After completion of the Kotapanjang HEPP project, part of West Sumatra province and substantial area of Riau province have received electricity from the system (see Figure 3-6).

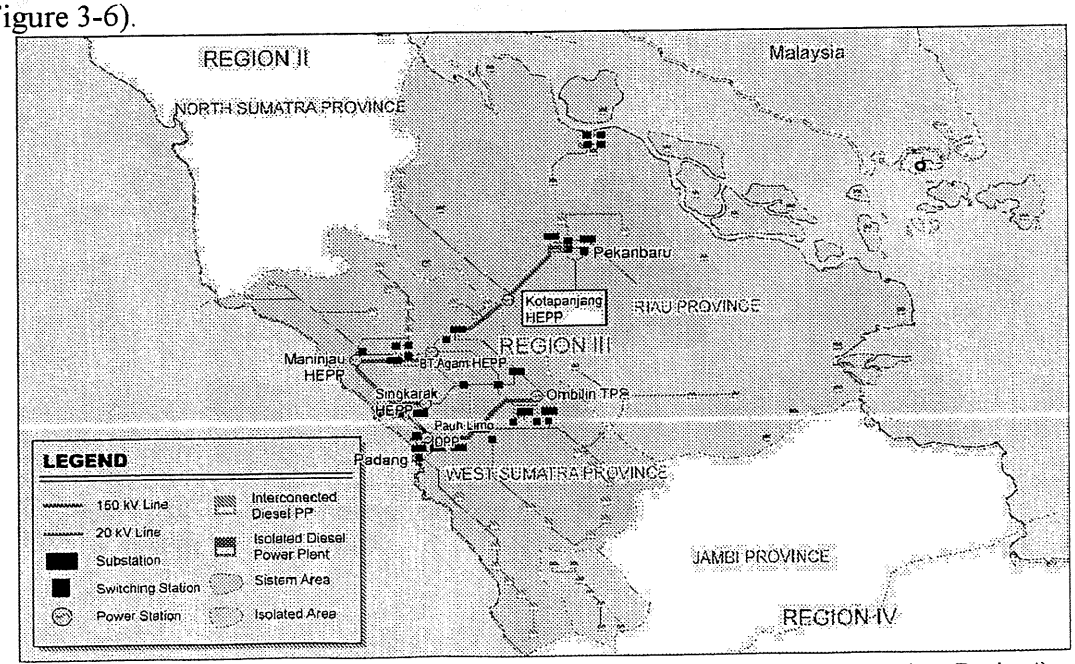


Figure 3-6: Supply Area by the Grid System in 1998 (After the Project)
Base Map was prepared by PLN Region III

As a result, most of existing PLN's isolated diesel power plants finished their duties, and some were now in shutdown conditions and others were relocated to other locations. Instead, consumers within system area received electricity from the big power station, including the Kotapanjang HEPP, through 150 kV/ 20 kV transmission line system.

The Sumbar- Riau system has progressively developed year by year. Isolated system of Duri area and Dumai area were interconnected to the Sumbar- Riau System in November 2001 and February 2002, respectively (see Figure 3-7). According to North KITLUR*[13] Medan, the Sumbar- Riau system will interconnect to the South Sumatra system by the end of 2002 (detail will be mentioned in section 5 of this report).

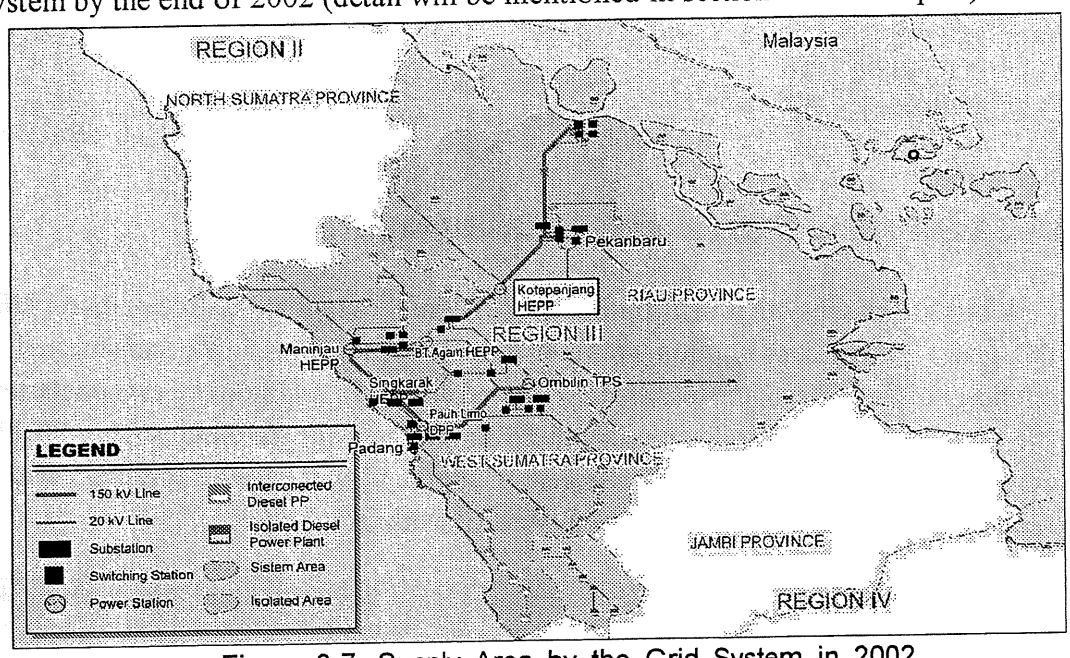


Figure 3-7: Supply Area by the Grid System in 2002

Base Map was prepared by PLN Region III

3.3.2 Energy Transmitted through the Newly Constructed Transmission Lines

Table 3-7 shows moth-wise energy transmitted through Kotapanjang (KTP)-Payakumbuh (PYK) section.

Table 3-7: Energy Transmitted "Kotapanjang – Payakumbuh Section (Unit: GWh)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1998	KTP->PYK	0.2	4.3	4.8	10.6	1.1	3.1	5.1	5.8	7.0	5.2	4.7	3.1	55.0
	KTP<-PYK	3.7	4.3	1.2	0.6	6.1	3.0	2.0	1.8	1.3	3.0	2.3	2.5	32.0
1999	KTP->PYK	2.7	2.1	1.4	1.0	0.9	0.5	1.1	0.1	11.2	2.7	2.0	0.6	26.1
	KTP<-PYK	3.2	2.0	4.3	4.8	5.7	6.4	14.5	19.1	1.6	2.6	7.9	12.5	84.5
2000	KTP->PYK	3.6	10.8	0.5	2.0	0.6	0.3	0.0	0.3	0.1	0.0	0.5	2.2	20.9
	KTP<-PYK	3.5	0.5	12.8	6.3	9.6	11.7	23.8	14.6	19.7	24.4	18.0	9.8	154.7
2001	KTP->PYK	4.0	12.5	6.0	0.4	7.9	1.4	0.0	0.1	0.0	0.0	0.1	1.4	33.7
	KTP<-PYK	8.3	0.7	5.7	13.8	2.4	11.6	24.2	21.8	28.3	35.8	26.6	11.8	191.1
2002	KTP->PYK	2.0	3.6	-	-	-	-	-	-	-	-	-	-	5.6
	KTP<-PYK	11.8	9.9	-	-	-	-	-	-	-	-	-	-	21.7

Data Source: PLN Sector Padang

The Table 3-8 shows month-wise energy transmitted through Kotapanjang-

[13] North KITLUR (North Sumatra Generation and Transmission Unit): Operation and maintenance agency of the Kotapanjang HEPP.

Bangkinang (BKN)- Pekanbaru (PKB) transmission line sections.

Table 3-8: Energy Transmitted Kotapanjang – Pekanbaru Section (Unit: GWh)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1998	KTP->PKB	2.5	7.7	7.0	9.8	12.3	11.1	13.2	13.2	28.8	14.3	13.8	14.6	148.3
	KTP->BKN	1.5	2.0	7.9	11.0	13.1	12.4	13.5	14.8	2.2	16.0	16.0	16.8	127.1
1999	KTP->PKB	13.7	14.5	16.3	16.2	17.0	16.8	17.5	17.4	17.2	18.1	17.7	18.7	201.1
	KTP->BKN	15.5	16.5	18.6	18.5	19.3	19.3	19.7	19.7	19.5	20.5	20.2	21.4	228.7
2000	KTP->PKB	17.4	18.3	20.1	19.6	21.1	19.6	20.7	21.0	20.8	21.7	21.3	21.4	242.9
	KTP->BKN	19.8	20.6	22.9	22.3	24.0	22.4	23.7	23.7	23.8	24.7	24.2	24.6	276.7
2001	KTP->PKB	21.7	20.3	20.6	22.5	23.8	23.3	24.6	24.6	24.0	26.6	26.4	26.1	284.7
	KTP->BKN	24.5	12.8	37.2	25.4	27.0	26.3	27.7	28.0	27.2	28.3	28.7	29.3	322.4
2002	KTP->PKB	28.6	25.8	-	-	-	-	-	-	-	-	-	-	54.4
	KTP->BKN	31.9	28.4	-	-	-	-	-	-	-	-	-	-	60.4

Data Source: PLN Sector Pekanbaru

3.3.3 Load on the Newly Constructed Substations

A new trunk substation distributing the generated output at the Kotapanjang HEPP to the major power consumption areas in Riau province was newly constructed in the outskirts of Pekanbaru, a capital city of the province. In addition, a new substation near the town of Bangkinang, located about 15 km away from the Kotapanjang HEPP, was constructed and two 150 kV transmission line bays were newly installed at existing substation (Payakumbuh substation) in West Sumatra province.

	Pekanbaru Substation (New Construction)	Bangkinang Substation (New Construction)	Payakumbuh Substation (Expansion)
150 kV transmission line	2 bays	2 bays	2 bays
150 kV/20 kV transformer	2 bays with 50 MVA x 2	1 bay with 10 MVA x 1	
150 kV bus couple	1 bay	-	
20 kV express feeder	2 feeders	4 feeders	
20 kV outgoing feeder	14 feeders	-	

Historical data of peak load and load factor[*14] of the transformers in the newly constructed substation/ switchyard is shown in Table 3-12 and 3-13.

In order to meet increasing demand and to avoid overloading of transformer, NPC is planning to install additional transformers with the capacity of 20 MVA in the Bangkinang substation and the Kotapanjang switchyard by the end of 2002.

[14] Load Factor: Peak Load/ Transformer's Capacity x 100. Generally speaking, a transformer is able to operate even if the load factor is beyond 100%. However, an over-load on a transformer results in the shortening of facility's durability, an increase in transformation loss, and a drop in voltage. If the over-load condition continues, it results in a brownout/ blackout of surrounding consumer coverage areas or break down of the transformer. Thus, the allowable load factor to be 80%, as a result of taking the stability of the grid condition and the forced outage of other transformers into consideration.

Table 3-9: Peak Load on the Transformers (Unit: MVA)

		Capacity	1998	1999	2000	2001	2002
Pekanbaru Substation	No. 1	50 MVA	40.1	38.1	40.5	39.7	26.1
	No. 2	50 MVA	36.0	31.7	28.2	46.1	36.8
Bangkinang Substation		10 MVA	7.8	7.5	10.2	8.5	8.2
Kotapanjang Switchyard		10 MVA	3.6	6.6	7.7	9.1	9.1

Data Source: PLN Sector Pekanbaru, PLN Sector Padang

Table 3-10: Load Factor on the Transformers (Unit: %)

		1998	1999	2000	2001	2002
Pekanbaru Substation	No. 1	80.20%	76.21%	81.05%	79.37%	52.21%
	No. 2	72.00%	63.37%	56.42%	92.21%	73.68%
Bangkinang Substation		78.00%	74.74%	102.11%	85.26%	82.11%
Kotapanjang Switchyard		36.00%	66.32%	76.84%	90.53%	90.53%

Data Source: PLN Sector Pekanbaru, PLN Sector Padang

3.4 Re-calculation of the Internal Rate of Return

3.4.1 Financial Internal Rate of Return (FIRR)

The Financial Internal Rate of Return (FIRR) of the project was re-evaluated taking into account the changes in project cost and selling price, operational data and related variables. As a result, the newly calculated FIRR is worked out at 6.1% in base case, 3.8 percentage points lower than the appraisal estimate of 9.9 % (see Table 3-11).

Table 3-11: Cash Flow of FIRR Calculation (Base Case)

		Sales Volume (MWh)	Transfer Price (Yen/kWh)	Total Revenue (Mil Yen)	Capital Cost (Mil Yen)*	O/ M Cost (Mil Yen)*	Total Cost (Mil Yen)	Net Benefit (Mil Yen)
91					10,425.5		10,425.5	-10,425.5
92					171,421.4		171,421.4	-171,421.4
93					210,937.3		210,937.3	-210,937.3
94					181,098.7		181,098.7	-181,098.7
95					143,462.2		143,462.2	-143,462.2
96					213,947.9		213,947.9	-213,947.9
97					89,624.8		89,624.8	-89,624.8
98	1	299,929.4	105.680	30,881.9	185,952.7	689.0	186,641.7	-155,759.8
99	2	390,463.4	222.327	84,510.2	90,091.8	1187.4	91,279.2	-6,769.0
00	3	409,521.7	149.059	59,394.9		2888.9	2,888.9	56,506.0
01	4	480,823.4	137.308	64,238.3		5415.0	5,415.0	58,823.3
02	5	538,368.6	211.846	110,971.9		5415.0	5,415.0	105,556.9
|	|	|	|	|		|	|	|
47	50	523,832.6	211.846	110,971.9		5415.0	5,415.0	105,556.9

FIRR= 6.14%

a) Basic Assumptions

Except for benefits, basic assumptions of the calculation follow the same methodology as used in the appraisal. The economic life of the project is assumed to be 50 years after the operation (1998). All prices and costs are expressed Indonesian

rupiah in year 1998 value. All nominal prices are transferred to 1998 value by using consumer price index.

b) Costs

The costs used for re-evaluation are financial capital costs and operation and maintenance (O&M) costs of the power station and dam. The financial capital cost of the project is derived from the actual financial costs of the both stage of the project, which include civil work, construction cost of power station/ transmission line/ substations/ relocation road & bridge, consulting service, land acquisition, monetary compensation for ousters and tax, but doesn't include resettlement villages related cost*[15]. O&M costs from 1998 to 2001 are used actual costs, and future O&M costs are assumed to be same price as 2001 actual costs.

c) Benefits

In calculating the project's benefit, re-evaluation is not following original methodology adopted at appraisal, because the following methodology is deemed to be reflected much real situation. At appraisal, the benefit consisted of (a) incremental revenue generated from the power station, and (b) fuel cost saving by construction of transmission line. As that time, incremental revenue was worked out by multiplying the gross energy production generated from the project with the electricity tariff to the consumers after due consideration to the transmission and the distribution loss. Under this formula, all incremental revenue generated by the project was considered as a benefit of the project. However, the incremental benefit is derived not only from the generation project, but also from the transmission and distribution system. Thus, normally only certain proportion of incremental revenue is recognized as benefit of construction of power station. In addition, fuel cost saving should not be considered as benefit.

In re-evaluating FIRR of the project, benefit was defined as sales volume from North KITLUR to PLN Region multiplied by average transfer price*[16]. Sales volume to PLN Region was worked out by "net energy production" minus "auxiliary use of power station" minus "transmission loss of the system". Benefit from 1998- 2001 was calculated based on available data collected during the site survey. Future auxiliary use*[17] is assumed by using actual average auxiliary use ratio*[18] of 0.67%.

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[15] Estimated Resettlement Related costs include, development and rehabilitation cost of rubber plantation, construction of water supply system and housing for resettlement village, additional support from ODA loan (construction of water supply system, etc). Resettlement Related cost was estimated by the SAPS team, based on the actual disbursement from Riau province, and rehabilitation/ maintenance cost for the action plan.

[16] In 1997, PLN divided their electricity business in Sumatra Island into two Generation & Transmission Business Units (KITLUR- North and South), and four Distribution Business Units (PLN Region I - IV). PLN's business units prepare their own financial statement, in order to pursue profitable business. In case of Sumatra, KITLUR selling their electricity to PLN Region at prescribed price by PLN headquarter. However, actually this internal transfer is only for preparing financial statement of each business unit, thus no actual transaction is made.

[17] The consumption of station service or auxiliary needs (such as fan motors, pump motors, and other equipment essential to the operation of the generating units.

Future transfer price and transmission loss are assumed same as 2002 actual price and 2001 actual loss (2.70%), respectively. In base case, future gross energy production are assumed to be the same volume as the target level.

	Benefit of the Project
Original	Incremental Revenue (Originate from Construction of Power Station) Sales Volume from PLN to consumer (Gross Energy Production – System Loss[*19]) x Selling Price to Consumers
	Fuel Cost Saving (Originate from Construction of Transmission Line) Energy Production x Heat Rate of Existing Generating Unit x Unit Fuel Price / Heat Content of Fuel
Re-Evaluation	Incremental Revenue Sales Volume to Region: (Net Energy Production – Transmission Loss) x Transfer Price from KITLUR to Region

d) Sensitivity Analysis

Twenty-four cases are conducted for sensitivity analysis: including the resettlement related cost[*20], decrease and increase of energy production and transfer price (see Table 3-12, 13). Transfer cost to PLN Region was increased from 191.78 rupiahs/ kWh in 2001 to 319.93 rupiahs kWh in 2002. This price increase was based on the increase in selling price from PLN Region to consumers.

Table 3-12: Sensitive Analysis Excluding Resettlement Villages Related Cost

Future Transfer Price / Future Energy Production	20% lower than actual price in 2002	10% lower than actual price in 2002	Same as actual price in 2002	10% higher than actual price in 2002
10% lower than target	4.47%	5.05%	5.59%	6.09%
Same as target level	4.99%	5.59%	6.14% (Base Case)	6.65%
10% higher than target	5.47%	60.9%	6.65%	7.18%

Table 3-13: Sensitive Analysis Including Resettlement Villages Related Cost

Future Transfer Price / Future Energy Production	20% lower than actual price in 2002	10% lower than actual price in 2002	Same as actual price in 2002	10% higher than actual price in 2002
10% lower than target	3.56%	4.11%	4.62%	5.09%
Same as target level	4.05%	4.62%	5.14%	5.63%
10% higher than target	4.51%	5.09%	5.63%	6.13%

3.4.2 Economic Internal Rate of Return (EIRR)

A rough re-evaluation of Economic Internal Rate of Return (EIRR) of the project is undertaken, for reference. All cost and benefit streams used in the re-evaluation were expressed in 1998 prices, and denominated in Indonesian Rupee. As a result, the EIRR of the project is calculated to be 10.6% (see Table 3-14). As FIRR calculation, the economic life of the project is assumed to be 50 years after operation (1998).

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[18] Auxiliary use divided by gross energy consumption

[19] System Loss (15.5%) comprised of transmission and distribution loss (13.5%), and auxiliary consumption (2.0%).

[20] Annual resettlement cost (1990-97) is estimated on the basis of the implementation schedule of resettlement and total amount of resettlement cost provided by Provincial Government. The annual resettlement costs from 1999 to 2004 is data provided from Provincial and Regional Governments.

Table 3-14: Cash Flow of EIRR Calculation

		Sales Volume of Electricity (MWh)	Fuel Cost for Diesel Gen (Rs./kWh)	Other Cost for Diesel Gen (Rs./kWh)	Total Benefit (Mil Rs.)	Capital Cost (Rs. Yen)	O/ M Cost (Mil Rs.)	Total Cost (Mil Rs.)	Net Benefit (Mil Rs.)
91						1383.412		1383.4	-9,382.9
92						1505.279		1505.3	-154,279.3
93						1741.193		1741.2	-189,843.6
94						1948.417		1948.4	-162,988.8
95						2205.330		2205.3	-129,115.9
96						1982.663		1982.7	-192,553.1
97						2177.598		2177.6	-80,662.4
98	1	299929.4	185.0	45.0	68,970.3	6884.302	8.11	6892.4	-99,076.2
99	2	390463.4	153.6	37.3	74,526.1	6224.592	18.73	6243.3	-7,744.0
00	3	409521.7	150.6	36.6	76,635.8		38.94	38.94	73,746.9
01	4	480823.4	205.9	50.0	123,029.4		75.61	75.61	117,614.4
02	5	538368.6	269.5	65.5	180,347.8		75.61	75.61	174,932.8
03	6	538368.6	269.5	65.5	180,347.8		75.61	75.61	174,932.8
04	7	538368.6	269.5	65.5	180,347.8		75.61	75.61	174,932.8
05	8	538368.6	269.5	65.5	180,347.8		75.61	75.61	174,932.8
|	|	|	|	|	|		|	|	|
47	50	538368.6	269.5	65.5	180,347.8		75.61	75.61	174,932.8

EIRR= 10.6%

a) Costs

The costs used for re-evaluation are financial capital costs and operation and maintenance (O&M) costs of the power station and dam. The financial capital cost of the project is derives from the actual financial costs of the both stage of the project, which include civil work, construction cost of power station, transmission line, substations, relocation road & bridge, consulting service, land acquisition, and tax. But it does not include the resettlement related costs. Financial capital costs and O&M costs of the project are transferred into the economic cost by applying conversion factor of 0.9.

b) Benefits

Before the project implementation, some population in villages used their own private small-diesel generators. Thus, in this calculation, fuel cost, other O&M cost of these diesel generators was assumed as Willingness to Pay (WTP) of consumers.

Fuel cost for a private diesel generator with rated capacity of 10 kW was worked out by multiplying specific fuel oil consumption of 0.37 liters/kWh and HSD price (500 rupiahs/liter in 1998 - 1,100 rupiahs/liter in 2002). Other O&M costs of small diesel generator, including depreciation, were calculated as multiplying fuel cost and 0.243[*21].

[21] In case of PLN average generation cost of diesel (231.92 Rp/kWh) in 2000, 75.7% of generation cost was occupied by fuel cost (175.49 Rp/kWh). Accordingly, using (1 - 0.757)= 0.243 for conversion factor.

3.5 Contribution for Demand- Supply Balance at Riau Province

3.5.1 Contribution for Stable Electricity Supply

Table 3-15, and 3-16 indicate the "System Average Interruption Duration Index" (SAIDI)[*22] and the "System Average Interruption Frequency Index" (SAIFI) [*23] from 1997 to 2001.

Table 3-15: SAIDI of the Region III

	West Sumatra Province			Riau Province		
Area	Padang	Bukit tinggi	Solok	Pekan baru	Dumai	Rengat
1997	15.19	28.22	16.27	80.69	19.21	33.59
1998	31.38	20.14	7.63	38.96	20.51	27.84
1999	44.25	17.97	7.03	36.05	17.12	30.06
2000	35.76	16.14	4.32	37.18	67.46	30.38
2001	25.62	14.06	3.78	23.66	67.28	24.18

Table 3-16: SAIFI of the Region III

West Sumatra Province			Riau Province		
Padang	Bukit tinggi	Solok	Pekan baru	Dumai	Rengat
15.46	16.01	41.86	75.2	13.25	31.54
36.04	14.02	20.15	46.4	17.84	31.88
46.6	13.09	13.4	31.07	13.06	31.36
45.38	16.14	9.14	31.51	20.38	28.26
35.1	12.71	5.6	19.15	30.03	21.77

Data Source: PLN Region III

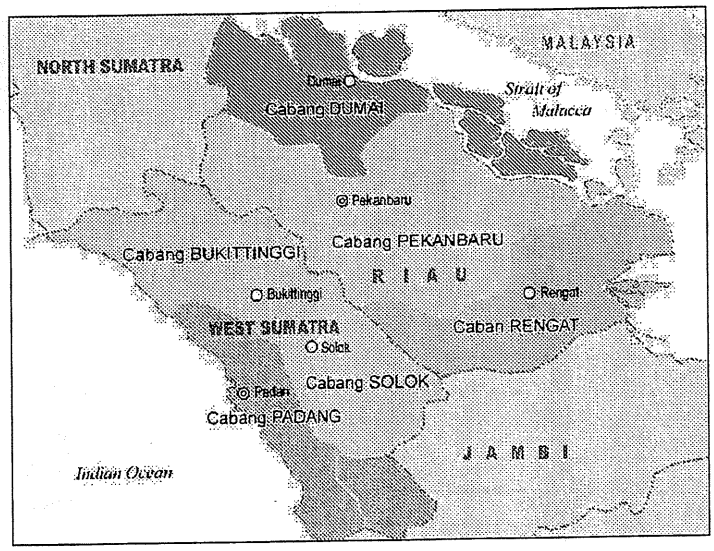


Figure 3-8: Administrative Area of Region III

[22] SAIDI: The cumulative length of power interruption, in hours, that a customer within a certain area experiences on the average, during a year

[23] SAIFI: The average number of times each customer within a area experiences interruption during a year

Appendix: "3. Effectiveness" Data Sheet

Table 3A-1: Consumer Price Index and Exchange Rate

	Exchange Rate (Rupiah per US$)	Exchange Rate (Rupiah per JPY)	Consumer Price Index (Indonesia: 1990= 100)	Consumer Price Index (Japan: 1990= 100)
1988	1,685.70	1315.4	87.2	94.9
1989	1,770.10	1283.1	92.8	97
1990	1,842.80	1272.7	100	100
1991	1,950.30	1447.8	109.4	103.3
1992	2,029.90	1602.8	117.7	105.1
1993	2,087.10	1876.9	129	106.4
1994	2,160.80	2114.1	140	107.1
1995	2,248.60	2390.6	153.2	107
1996	2,342.30	2153.2	165.5	107.2
1997	2,909.40	2404.7	176.5	109
1998	10,013.60	7649.2	278.4	109.7
1999	7,855.20	6896	335.4	109.4
2000	9,595.00	8423.3	347.8	108.6
2001	10,400.00	9,130.00	387.7	107.9
2002 Jan	10,377.30	9,110.00		107.1

Data Source: International Monetary Fund "International Financial Statistics"

Table 3A-2: Change in Fuel Price

	Oil (Rupee/Liter)		Coal (Rupee/kg)		Natural Gas (Rupee/MSCF)		Geothermal (Rupee/kWh)	
	Nominal	Constant	Nominal	Constant	Nominal	Constant	Nominal	Constant
1988/89	206.4	236.7	56.0	64.2	50.1	57.5	44.8	51.4
1989/90	207.3	223.4	76.0	81.9	54.6	58.9	44.8	48.3
1990/91	240.2	240.2	68.2	68.2	55.7	55.8	49.3	49.3
1991/92	257.3	235.2	66.3	60.6	65.9	60.3	49.3	45.0
1992/93	292.9	248.8	65.2	55.4	63.9	54.3	49.3	41.9
1993/94	322.9	250.3	68.7	53.2	45.9	35.6	69.0	53.5
1994	323.5	231.0	70.3	50.2	55.8	39.9	90.2	64.4
1995	343.9	224.4	72.9	47.6	62.9	41.1	90.2	58.8
1996	352.1	212.8	69.4	42.0	68.8	41.6	108.9	65.8
1997	339.4	192.3	60.0	34.0	68.7	39.0	99.1	56.2
1998	405.6	145.7	74.9	26.9	264.1	94.9	254.0	91.2
1999	500.1	149.1	140.7	42.0	210.7	62.8	246.2	73.4
2000	515.0	148.1	153.8	44.2	217.9	62.6	221.6	63.7

Constant Price= Year 1990

Data Source: PLN Statistic

Table 3A-3: Energy Production by Type of Generation in 2000 (Unit: GWh)

	Hydro	Steam	Gas Turbine	Combined Cycle	Geothermal	Diesel	Total
Java- Bali	6,310(9.5%)	34,779(52.2%)	487(0.7%)	22,291(33.5%)	2,649(4.0%)	103(0.2%)	66,617
Outer Island*	1,385(19.9%)	0(0.0%)	292(4.2%)	469(6.7%)	0(0.0%)	4,292(61.6%)	6,970
Sumatra	1,415(12.7%)	3,650(32.9%)	473(4.3%)	3,637(32.8%)	0(0.0%)	1,960(17.7%)	11,098
Region I-IV	8(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	1,160(100.0%)	1,168
KITLURs	1,406 (14.2%)	3,650(36.8%)	473(4.8%)	3,637(36.6%)	0(0.0%)	764 (7.7%)	9,930

* Data Outer Island doesn't include energy production in Region III and KITLUR Data Source: PLN Statistic

Table 3A- 4: Operational Performance of the Kotapanjang HEPP (Unit 1)

		Operation Hours (Hrs.)	Gross Energy Production (MWh)	Peak Load (MW)	Plant Load Factor (%)	Availability Factor* (%)	Planned Outage Factor (%)	Forced Outage Factor (%)
1998	Jan	-	-	-	-	-	-	-
	Feb	-	-	-	-	-	-	-
	Mar	-	-	-	-	-	-	-
	Apr	-	-	-	-	-	-	-
	May	-	-	-	-	-	-	-
	Jun	-	-	-	-	-	-	-
	Jul	-	-	-	-	-	-	-
	Aug	-	-	-	-	-	-	-
	Sep	-	-	-	-	-	-	-
	Oct	26	180.0	34.67	0.637%	100.00%	0.00%	0.00%
	Nov	468	12,339.6	35.90	45.101%	100.00%	0.00%	0.00%
	Dec	673	16,305.9	36.76	57.675%	98.29%	1.52%	0.19%
1999	Jan	610	14,223.0	36.90	50.308%	99.20%	0.78%	0.02%
	Feb	654	16,204.5	38.00	63.457%	98.35%	1.52%	0.13%
	Mar	691	16,949.1	37.75	59.950%	98.13%	1.82%	0.05%
	Apr	670	15,618.4	37.56	57.085%	98.44%	1.52%	0.05%
	May	725	16,765.2	37.90	59.300%	98.79%	1.02%	0.19%
	Jun	704	16,193.4	37.85	59.186%	98.50%	1.44%	0.06%
	Jul	427	9,617.1	37.75	34.016%	99.39%	0.39%	0.22%
	Aug	275	5,640.3	34.53	19.950%	99.09%	0.76%	0.15%
	Sep	555	14,268.6	38.16	52.151%	81.71%	18.23%	0.06%
	Oct	666	14,168.4	35.05	50.115%	99.01%	0.94%	0.05%
	Nov	445	10,245.6	34.30	37.447%	65.42%	34.58%	0.00%
	Dec	435	10,450.2	37.06	36.963%	90.29%	9.68%	0.04%
2000	Jan	675	14,507.4	33.54	51.314%	98.69%	0.94%	0.37%
	Feb	658	17,376.9	37.90	65.702%	98.80%	1.01%	0.19%
	Mar	627	14,472.0	37.08	51.188%	99.88%	0.09%	0.03%
	Apr	720	17,716.5	37.52	64.753%	100.00%	0.00%	0.00%
	May	601	13,053.0	37.76	46.169%	94.83%	1.08%	4.10%
	Jun	58	1,005.0	30.28	3.673%	99.89%	0.11%	0.00%
	Jul	217	5,610.9	34.95	19.846%	100.00%	0.00%	0.00%
	Aug	467	11,199.9	36.55	39.615%	99.99%	0.00%	0.01%
	Sep	513	11,419.2	36.53	41.737%	99.99%	0.00%	0.01%
	Oct	180	3,949.8	32.70	13.971%	100.00%	0.00%	0.00%
	Nov	402	10,807.2	37.50	39.500%	100.00%	0.00%	0.00%
	Dec	195	11,682.0	35.43	41.320%	99.92%	0.00%	0.08%
2001	Jan	539	13,698.0	37.54	48.451%	99.98%	0.00%	0.02%
	Feb	625	18,196.5	38.05	71.258%	99.99%	0.00%	0.02%
	Mar	512	13,758.9	37.60	48.666%	99.98%	0.00%	0.03%
	Apr	505	11,227.2	35.78	41.035%	100.00%	0.00%	0.00%
	May	689	15,792.9	37.20	55.861%	96.82%	0.00%	3.19%
	Jun	718	19,129.2	38.12	69.917%	99.97%	0.00%	0.04%
	Jul	41	1,311.3	29.12	4.638%	20.40%	0.00%	79.60%
	Aug	0	0.0	0.00	0.000%	0.00%	0.00%	100.00%
	Sep	0	0.0	0.00	0.000%	0.00%	0.00%	100.00%
	Oct	0	0.0	0.00	0.000%	0.00%	0.00%	100.00%
	Nov	0	0.0	0.00	0.000%	0.00%	0.00%	100.0%
	Dec	414	9,017.4	27.95	31.895%	90.32%	0.00%	9.68%
2002	Jan	576	14,975.7	32.35	52.970%	99.66%	0.00%	0.34%
	Feb	567	17,150.4	38.10	60.662%	100.00%	0.00%	0.00%
	Mar		14,817.0		52.409%			

* Availability Factor: A measure of time that a generating unit is capable of providing service, whether or not it is actually in service. This measure is expressed as a percent available for the period under consideration.

Table 3A- 5: Operational Performance of the Kotapanjang HEPP (Unit 2)

		Operation Hours (Hrs.)	Gross Energy Production (MWh)	Peak Load (MW)	Plant Load Factor (%)	Availability Factor (%)	Planned Outage Factor (%)	Forced Outage Factor (%)
1998	Jan	-	-	-	-	-	-	-
	Feb	-	-	-	-	-	-	-
	Mar	99	2,743.2	35.80	9.70%	86.09%	13.91%	0.00%
	Apr	591	14,743.8	37.20	53.89%	95.42%	4.58%	0.00%
	May	391	8,771.7	37.95	31.03%	52.25%	0.00%	47.75%
	Jun	576	13,207.6	37.95	48.27%	100.00%	0.00%	0.00%
	Jul	636	14,980.6	37.92	52.99%	100.00%	0.00%	0.00%
	Aug	640	16,750.0	37.66	59.25%	100.00%	0.00%	0.00%
	Sep	695	18,154.8	38.00	66.36%	99.08%	0.83%	0.09%
	Oct	650	17,188.5	38.00	60.80%	97.39%	2.55%	0.06%
	Nov	480	11,539.4	37.77	42.18%	97.67%	2.22%	0.11%
	Dec	695	16,968.6	36.71	60.02%	97.77%	2.01%	0.22%
1999	Jan	662	15,903.0	36.50	56.25%	99.26%	0.56%	0.18%
	Feb	651	16,337.4	38.00	63.98%	97.94%	2.01%	0.05%
	Mar	704	16,506.9	38.00	58.39%	98.02%	1.88%	0.10%
	Apr	236	4,786.5	32.35	17.49%	32.68%	67.22%	0.10%
	May	0	0.0	0.00	0.00%	0.00%	100.00%	0.00%
	Jun	0	0.0	0.00	0.00%	0.00%	100.00%	0.00%
	Jul	318	7,330.2	38.00	25.93%	99.55%	0.00%	0.45%
	Aug	337	7,074.9	37.08	25.02%	99.17%	0.84%	0.00%
	Sep	666	17,040.3	38.00	62.28%	98.77%	1.16%	0.07%
	Oct	600	12,774.9	35.65	45.19%	98.99%	1.01%	0.00%
	Nov	520	12,302.4	37.95	44.96%	100.00%	0.00%	0.00%
	Dec	437	10,207.5	36.93	36.10%	99.01%	0.92%	0.07%
2000	Jan	645	13,959.3	34.10	49.38%	99.06%	0.94%	0.00%
	Feb	646	17,030.7	37.94	64.39%	98.74%	1.15%	0.11%
	Mar	470	11,004.6	37.20	38.92%	99.42%	0.49%	0.09%
	Apr	579	14,232.9	37.62	52.02%	100.00%	0.00%	0.00%
	May	734	19,416.0	37.80	68.68%	98.38%	1.08%	0.54%
	Jun	598	14,671.5	37.84	53.62%	99.80%	0.11%	0.09%
	Jul	206	3,570.6	36.05	12.63%	99.99%	0.00%	0.01%
	Aug	364	9,389.1	37.58	33.21%	99.95%	0.00%	0.05%
	Sep	220	5,198.4	35.01	19.00%	99.95%	0.00%	0.05%
	Oct	343	7,167.6	36.00	25.35%	100.00%	0.00%	0.00%
	Nov	374	11,290.5	32.00	41.27%	100.00%	0.00%	0.00%
	Dec	205	12,063.3	37.00	42.67%	99.93%	0.00%	0.07%
2001	Jan	551	14,295.0	38.05	50.56%	100.00%	0.00%	0.00%
	Feb	672	19,354.5	39.07	75.79%	100.00%	0.00%	0.00%
	Mar	552	15,411.0	37.60	54.51%	99.80%	0.00%	0.20%
	Apr	371	8,955.0	25.70	32.73%	100.00%	0.00%	0.00%
	May	713	21,229.5	37.20	75.09%	96.90%	0.00%	3.10%
	Jun	248	6,511.5	38.12	23.80%	75.97%	24.03%	0.00%
	Jul	388	10,009.9	29.87	35.41%	93.99%	0.00%	6.01%
	Aug	736	16,614.6	36.90	58.77%	100.00%	0.00%	0.00%
	Sep	450	9,423.0	27.34	34.44%	100.00%	0.00%	0.00%
	Oct	191	4,695.0	32.50	16.61%	100.00%	0.00%	0.00%
	Nov	570	14,960.4	36.72	54.68%	98.77%	0.00%	1.23%
	Dec	728	19,629.0	36.87	69.43%	100.00%	0.00%	0.00%
2002	Jan	692	19,066.5	37.43	67.44%	99.66%	0.00%	0.34%
	Feb	470	14,407.5	38.67	56.42%	100.00%	0.00%	0.00%
	Mar		13,341.0		47.19%	100.00%		

Table 3A- 6: Operational Performance of the Kotapanjang HEPP (Unit 3)

		Operation Hours (Hrs.)	Gross Energy Production (MWh)	Peak Load (MW)	Plant Load Factor (%)	Availability Factor (%)	Planned Outage Factor (%)	Forced Outage Factor (%)
1998	Jan	96	1,095.6	38.00	3.88%	100.00%	0.00%	0.00%
	Feb	405	4,269.0	38.00	16.72%	84.08%	10.71%	5.21%
	Mar	717	17,657.7	38.00	62.46%	86.96%	0.94%	12.10%
	Apr	647	18,039.9	37.60	65.94%	99.58%	0.42%	0.00%
	May	519	13,263.9	38.00	46.92%	69.76%	0.19%	30.05%
	Jun	472	11,275.8	37.00	41.21%	99.03%	0.00%	0.97%
	Jul	571	13,932.0	37.92	49.28%	100.00%	0.00%	0.00%
	Aug	630	17,091.0	38.00	60.45%	100.00%	0.00%	0.00%
	Sep	627	16,152.0	38.00	59.04%	89.72%	10.14%	0.14%
	Oct	641	16,027.5	37.91	56.69%	97.01%	2.96%	0.03%
	Nov	358	8,770.5	37.74	32.06%	98.77%	1.11%	0.12%
	Dec	0	0.0	0.00	0.00%	100.00%	0.00%	0.00%
1999	Jan	0	0.0	0.00	0.00%	0.00%	100.00%	0.00%
	Feb	0	0.0	0.00	0.00%	0.00%	100.00%	0.00%
	Mar	0	0.0	0.00	0.00%	0.00%	100.00%	0.00%
	Apr	512	12,358.2	37.87	45.17%	99.28%	0.72%	0.00%
	May	727	16,509.0	37.30	58.39%	98.16%	1.49%	0.35%
	Jun	699	15,719.4	37.41	57.45%	99.13%	0.88%	0.00%
	Jul	385	9,198.6	38.00	32.54%	98.93%	1.08%	0.00%
	Aug	343	6,882.0	35.04	24.34%	99.08%	0.87%	0.06%
	Sep	671	17,223.0	38.00	62.95%	99.21%	0.73%	0.06%
	Oct	646	13,764.3	37.55	48.69%	99.01%	1.00%	0.00%
	Nov	484	11,411.3	37.58	41.71%	100.00%	0.00%	0.00%
	Dec	415	9,549.6	37.01	33.78%	99.49%	0.47%	0.04%
2000	Jan	524	11,186.4	34.31	39.57%	99.08%	0.54%	0.38%
	Feb	663	17,302.5	38.00	65.42%	98.92%	0.72%	0.36%
	Mar	309	7,190.1	36.61	25.43%	99.26%	0.74%	0.00%
	Apr	324	7,995.9	36.10	29.22%	93.33%	6.67%	0.00%
	May	235	5,775.0	37.35	20.43%	31.60%	68.40%	0.00%
	Jun	699	17,067.9	37.69	62.38%	99.66%	0.11%	0.23%
	Jul	548	13,331.1	36.14	47.15%	99.89%	0.00%	0.11%
	Aug	461	11,742.3	35.74	41.53%	99.86%	0.00%	0.14%
	Sep	453	10,079.7	33.76	36.84%	99.89%	0.00%	0.11%
	Oct	649	12,938.7	35.00	45.77%	100.00%	0.00%	0.00%
	Nov	362	8,068.8	35.00	29.49%	99.44%	0.55%	0.01%
	Dec	379	17,892.0	37.00	63.29%	99.94%	0.00%	0.07%
2001	Jan	610	16,360.5	37.54	57.87%	100.00%	0.00%	0.00%
	Feb	667	20,734.5	38.09	81.20%	100.00%	0.00%	0.00%
	Mar	735	21,403.5	37.6	75.71%	100.00%	0.00%	0.00%
	Apr	631	16,776.6	35.78	61.32%	100.00%	0.00%	0.00%
	May	686	22,756.2	37.2	80.49%	97.00%	0.00%	3.00%
	Jun	615	16,415.7	38.12	60.00%	100.00%	0.00%	0.00%
	Jul	736	19,417.5	29.87	68.68%	99.94%	0.00%	0.06%
	Aug	742	16,854.0	36.46	59.61%	100.00%	0.00%	0.00%
	Sep	715	15,670.2	30.99	57.27%	100.00%	0.00%	0.00%
	Oct	707	16,776.9	33.65	59.34%	100.00%	0.00%	0.00%
	Nov	665	17,361.9	34.89	63.46%	99.02%	0.00%	0.98%
	Dec	741	19,969.5	36.11	70.63%	100.00%	0.00%	0.00%
2002	Jan	738	20,140.2	37.07	71.24%	99.97%	0.00%	0.03%
	Feb	671	19,620.3	38.73	76.83%	100.00%	0.00%	0.00%
	Mar		19,645.5		69.49%			

Table 3A- 7: Operational Performance of the Kotapanjang HEPP (Total)

		Operation Hours (Hrs.)	Gross Energy Production (MWh)	Net Energy Production (MWh)	Plant Load Factor (%)	Availability Factor (%)	Planned Outage Factor (%)	Forced Outage Factor (%)
1998	Jan	96	1,095.6	1,095.6	1.30%	100.00%	0.00%	0.00%
	Feb	405	4,269.0	4,054.2	5.57%	84.08%	10.71%	5.21%
	Mar	816	20,400.9	20,197.7	24.05%	86.53%	7.43%	6.05%
	Apr	1,238	32,783.7	32,544.9	39.94%	97.50%	2.50%	0.00%
	May	910	22,035.6	21,833.1	25.98%	61.01%	0.10%	38.90%
	Jun	1,048	24,483.4	24,284.9	29.83%	99.52%	0.00%	0.49%
	Jul	1,207	28,912.6	28,693.3	34.09%	100.00%	0.00%	0.00%
	Aug	1,270	34,726.2	34,513.6	40.94%	100.00%	0.00%	0.00%
	Sep	1,322	34,306.8	34,083.1	41.80%	94.40%	5.49%	0.12%
	Oct	1,317	33,396.0	33,169.7	39.37%	98.13%	1.84%	0.03%
	Nov	1,306	32,649.5	32,410.3	39.78%	98.81%	1.11%	0.08%
	Dec	1,368	33,274.5	33,048.9	39.23%	98.69%	1.18%	0.14%
1999	Jan	1,272	30,126.0	29,907.5	35.83%	66.15%	33.78%	0.07%
	Feb	1,305	32,541.9	32,330.1	42.48%	65.43%	34.51%	0.06%
	Mar	1,395	33,456.0	33,225.8	39.45%	65.38%	34.57%	0.05%
	Apr	1,418	32,763.1	32,526.6	39.92%	76.80%	23.15%	0.05%
	May	1,452	33,274.2	33,050.3	39.23%	65.65%	34.17%	0.18%
	Jun	1,403	31,912.8	31,698.5	38.88%	65.88%	34.11%	0.02%
	Jul	1,130	26,145.9	25,932.6	30.83%	99.29%	0.49%	0.22%
	Aug	955	19,597.2	19,400.3	23.11%	99.11%	0.82%	0.07%
	Sep	1,892	48,531.9	48,260.9	59.13%	93.23%	6.71%	0.06%
	Oct	1,912	40,707.6	40,424.8	48.00%	99.00%	0.98%	0.02%
	Nov	1,449	33,959.3	33,722.4	41.37%	88.47%	11.53%	0.00%
	Dec	1,287	30,207.3	29,983.6	35.62%	96.26%	3.69%	0.05%
2000	Jan	1,844	39,653.1	39,384.1	47.17%	98.94%	0.81%	0.25%
	Feb	1,967	51,710.1	51,446.7	67.50%	98.82%	0.96%	0.22%
	Mar	1,406	32,666.7	32,429.5	38.51%	99.52%	0.44%	0.04%
	Apr	1,623	39,945.3	39,690.9	48.67%	97.78%	2.22%	0.00%
	May	1,570	38,244.0	37,981.7	45.09%	74.94%	23.52%	1.55%
	Jun	1,355	32,744.4	32,510.3	39.89%	99.79%	0.11%	0.10%
	Jul	971	22,512.6	22,323.0	26.54%	99.96%	0.00%	0.04%
	Aug	1,292	32,331.3	32,105.2	38.12%	99.94%	0.00%	0.06%
	Sep	1,186	26,697.3	26,485.8	32.53%	99.94%	0.00%	0.06%
	Oct	1,172	24,056.1	23,834.1	28.36%	100.00%	0.00%	0.00%
	Nov	1,138	30,166.5	29,968.2	36.75%	99.81%	0.18%	0.00%
	Dec	779	41,637.3	41,362.1	49.09%	99.93%	0.00%	0.07%
2001	Jan	1,700	44,353.5	44,101.0	52.76%	99.99%	0.00%	0.01%
	Feb	1,964	58,285.5	58,015.3	76.08%	100.00%	0.00%	0.01%
	Mar	1,799	50,573.4	50,305.7	59.63%	99.93%	0.00%	0.08%
	Apr	1,507	36,958.8	36,714.2	45.03%	100.00%	0.00%	0.00%
	May	2,088	59,778.6	59,495.1	70.48%	96.91%	0.00%	3.10%
	Jun	1,581	42,056.4	41,792.5	51.24%	91.98%	8.01%	0.01%
	Jul	1,165	30,738.7	30,525.4	36.24%	71.44%	0.00%	28.56%
	Aug	1,478	33,468.6	33,229.5	39.46%	66.67%	0.00%	33.33%
	Sep	1,165	25,093.2	24,898.4	30.57%	66.67%	0.00%	33.33%
	Oct	898	21,471.9	21,296.9	25.32%	66.67%	0.00%	33.33%
	Nov	1,235	32,322.3	32,109.5	39.38%	65.93%	0.00%	34.07%
	Dec	1,883	48,615.9	48,339.9	57.32%	96.77%	0.00%	3.23%
2002	Jan	2006	54182.4	53,906.9	64.45%	99.76%	0.00%	0.24%
	Feb	1708	51178.2	50,937.0	66.81%	100.00%	0.00%	0.00%
	Mar	0	47803.5		56.36%			

Table 3A-8: Break Down of Out Flow from the Reservoir

		Out Flow (m^3/sec)	Discarded Flow* (m^3/sec)	Discarded Energy (MWh)	Turbine Discharge (m^3/sec)	Gross Energy Production (MWh)
1998	Sep	145.50	N.A	N.A	N.A	34,306.80
	Oct	143.00	N.A	N.A	N.A	33,396.00
	Nov	138.90	N.A	N.A	N.A	32,649.50
	Dec	136.50	N.A	N.A	N.A	33,274.50
1999	Jan	370.94	247.33	60,280	123.61	30,126.00
	Feb	333.43	185.61	40,860	147.82	32,541.90
	Mar	188.69	51.42	12,532	137.27	33,456.00
	Apr	138.37	0	0	138.37	32,635.80
	May	136.52	0	0	136.52	33,274.20
	Jun	135.3	0	0	135.30	31,912.80
	Jul	106.78	0	0	106.78	26,025.90
	Aug	79.21	0	0	79.21	19,306.20
	Sep	203.83	0	0	203.83	48,075.90
	Oct	389.57	222.55	54,241	167.02	40,707.60
	Nov	286.36	142.26	33,554	144.10	33,987.00
	Dec	260.64	136.7	33,317	123.94	30,207.30
2000	Jan	516.57	353.87	86,247	162.70	39,653.10
	Feb	313.39	86.59	19,743	226.80	51,710.10
	Mar	134.03	0	0	134.03	32,666.70
	Apr	169.36	0	0	169.36	39,945.30
	May	156.84	0	0	156.84	38,226.00
	Jun	138.83	0	0	138.83	32,744.40
	Jul	92.37	0	0	92.37	22,512.60
	Aug	132.66	0	0	132.66	32,331.30
	Sep	113.19	0	0	113.19	26,697.30
	Oct	98.70	0	0	98.70	24,056.10
	Nov	127.90	0	0	127.9	30,166.50
	Dec	170.84	0	0	170.84	41,637.30
2001	Jan	182.00	0	0	182.00	44,353.50
	Feb	264.80	0	0	264.80	58,285.50
	Mar	207.50	0	0	207.50	50,573.40
	Apr	156.70	0	0	156.70	36,958.80
	May	245.30	0	0	245.30	59,778.60
	Jun	178.30	0	0	178.30	42,056.40
	Jul	126.10	0	0	126.10	30,738.70
	Aug	137.30	0	0	137.30	33,468.60
	Sep	106.40	0	0	106.40	25,093.20
	Oct	88.10	0	0	88.10	21,471.90
	Nov	134.60	0	0	134.60	32,322.30
	Dec	207.50	0	0	207.50	48,615.90
2002	Jan	220.90	0	0	220.90	54,182.40
	Feb	232.50	0	0	232.50	51,178.20

* Discarded Flow= Out flow from spillway, which did not contribute for energy production

Table 3A-9: Peak Load on the Transformers in Newly Constructed Substations

		Kt. Panjang (10MVA)		Bangkinang (10MVA)		Pekanbaru			
						Unit 1 (50MVA)		Unit 2 (50MVA)	
		MVA	MVAR	MVA	MVAR	MVA	MVAR	MVA	MVAR
1998	Apr	2.8	1.0	5.9	2.2	32.6	16.0	16.3	6.2
	May	3.1	0.9	5.9	2.2	36.8	16.5	16.8	6.2
	Jun	3.3	1.2	7.4	3.2	31.4	14.4	19.9	7.1
	Jul	0.0	0.0	7.8	3.1	34.8	16.0	19.6	7.4
	Aug	0.0	0.0	7.6	3.2	36.4	18.5	15.7	6.0
	Sep	3.5	1.3	7.5	3.2	36.3	19.7	23.7	9.0
	Oct	3.5	1.3	5.9	1.8	36.2	20.2	36.0	17.9
	Nov	3.6	1.3	7.8	3.3	40.1	19.1	29.7	14.1
	Dec	3.6	1.3	6.6	2.4	35.6	18.5	24.9	10.0
1999	Jan	3.9	1.3	6.6	2.4	35.5	18.4	25.7	11.0
	Feb	4.1	1.4	6.3	2.3	27.6	12.8	13.6	5.3
	Mar	4.5	1.5	6.8	2.4	32.9	15.4	18.8	6.9
	Apr	4.8	1.7	6.5	2.4	32.5	15.2	20.0	7.5
	May	5.1	1.8	6.7	2.3	38.1	19.0	29.5	10.0
	Jun	5.2	1.9	7.5	2.7	23.1	9.8	25.3	10.2
	Jul	5.3	2.0	7.3	2.5	31.9	15.0	24.1	11.8
	Aug	5.4	1.9	6.6	2.3	32.9	13.1	22.5	9.0
	Sep	5.4	1.8	6.6	2.2	30.4	13.8	24.4	10.0
	Oct	5.5	2.0	6.7	2.3	29.7	13.5	31.7	14.0
	Nov	5.5	2.1	7.1	2.4	31.9	14.8	24.3	9.5
	Dec	6.6	2.2	7.1	2.4	27.6	12.1	27.5	11.8
2000	Jan	6.0	2.1	7.4	2.5	26.2	10.9	26.3	11.0
	Feb	6.0	2.2	7.5	2.5	31.6	14.7	25.2	10.1
	Mar	6.2	2.3	6.2	3.8	40.0	20.4	25.3	10.3
	Apr	6.3	2.4	7.8	2.6	40.5	20.9	22.6	0.7
	May	6.5	2.5	7.7	2.6	36.1	18.0	28.2	12.2
	Jun	6.5	2.4	7.7	2.5	25.5	11.0	24.4	10.0
	Jul	6.6	2.5	8.1	2.9	25.2	10.9	22.9	9.0
	Aug	6.8	2.3	10.2	4.2	25.2	10.9	22.9	9.0
	Sep	7.1	2.5	8.5	3.0	25.6	10.9	24.0	9.8
	Oct	7.1	4.2	8.1	2.7	34.7	16.0	14.5	7.0
	Nov	7.1	2.6	8.2	2.7	36.8	18.0	19.5	7.9
	Dec	7.7	2.8	8.1	2.7	28.2	11.3	24.4	10.5
2001	Jan	8.1	3.2	8.5	2.8	37.6	17.2	46.1	20.9
	Feb	7.6	2.9	8.5	2.8	30.7	12.8	33.5	14.8
	Mar	7.7	2.9	7.9	2.6	31.6	13.2	31.2	13.5
	Apr	7.8	3.0	8.2	2.8	37.4	17.3	27.4	11.3
	May	8.4	3.4	8.4	2.9	38.4	18.0	30.5	12.0
	Jun	8.0	3.1	7.6	2.4	30.4	13.0	25.6	10.7
	Jul	8.2	3.2	7.9	2.6	26.2	10.4	28.4	10.5
	Aug	8.4	3.4	7.9	2.5	29.7	12.7	27.9	11.8
	Sep	8.3	3.3	7.9	2.5	31.6	13.5	25.9	11.8
	Oct	8.3	3.6	7.8	2.5	25.3	11.0	27.9	11.0
	Nov	9.1	4.1	7.9	2.5	24.2	11.0	27.9	12.0
	Dec	9.1	4.1	8.0	4.1	39.7	11.5	27.4	11.5
2002	Jan	9.1	4.1	8.2	2.7	26.1	12.0	34.7	15.6
	Feb	8.8	3.2	7.8	2.6	20.2	8.3	36.8	16.8

Data Source: PLN Sector Pekanbaru

Table 3A-10: Cash Flow of FIRR Calculation (Base Case)

(Future Energy production: same as target level, Transfer price: Same as 2002 actual transfer price, Excluding Resettlement Villages Related Costs)

		Sales Volume (MWh)	Transfer Price (Rp/kWh)	Total Revenue (Mil Rp.)	Capital Cost (Mil Rp.)	O/ M Cost (Mil Rp.)	Total Cost (Mil Rp.)	Net Benefit (Mil Rp.)
91					10,425.5		10,425.5	-10,425.5
92					171,421.4		171,421.4	-171,421.4
93					210,937.3		210,937.3	-210,937.3
94					181,098.7		181,098.7	-181,098.7
95					143,462.2		143,462.2	-143,462.2
96					213,947.9		213,947.9	-213,947.9
97					89,624.8		89,624.8	-89,624.8
98	1	299,929.4	105.680	30,881.9	185,952.7	689.0	186,641.7	-155,759.8
99	2	390,463.4	222.327	84,510.2	90,091.8	1187.4	91,279.2	-6,769.0
00	3	409,521.7	149.059	59,394.9		2888.9	2,888.9	56,506.0
01	4	480,823.4	137.308	64,238.3		5415.0	5,415.0	58,823.3
02	5	538,368.6	211.846	110,971.9		5415.0	5,415.0	105,556.9
|	|	|	|	|	|	|	|
47	50	538,368.6	211.846	110,971.9		5415.0	5,415.0	105,556.9

FIRR= 6.14%

Table 3A-11: Cash Flow of FIRR Calculation

(10% higher energy production, 10% higher transfer price, Excluding Resettlement Villages Related Costs)

		Sales Volume (MWh)	Transfer Price (Rp/kWh)	Total Revenue (Mil Rp.)	Capital Cost (Mil Rp.)	O/ M Cost (Mil Rp.)	Total Cost (Mil Rp.)	Net Benefit (Mil Rp.)
91					10,425.5		10,425.5	-10,425.5
92					171,421.4		171,421.4	-171,421.4
93					210,937.3		210,937.3	-210,937.3
94					181,098.7		181,098.7	-181,098.7
95					143,462.2		143,462.2	-143,462.2
96					213,947.9		213,947.9	-213,947.9
97					89,624.8		89,624.8	-89,624.8
98	1	299,929.4	105.680	30,881.9	185,952.7	689.0	186,641.7	-155,759.8
99	2	390,463.4	222.327	84,510.2	90,091.8	1187.4	91,279.2	-6,769.0
00	3	409,521.7	149.059	59,394.9		2888.9	2,888.9	56,506.0
01	4	480,823.4	137.308	64,238.3		5415.0	5,415.0	58,823.3
02	5	592,205.5	233.031	134,276.0		5415.0	5,415.0	128,861.0
|	|	|	|	|	|	|	|
47	50	592,205.5	233.031	134,276.0		5415.0	5,415.0	2,195.3

FIRR= 7.18%

Table 3A-12: Cash Flow of FIRR Calculation

(10% lower energy production, 10% lower transfer price, Excluding Resettlement Villages Related Costs)

		Sales Volume (MWh)	Transfer Price (Rp/kWh)	Total Revenue (Mil Rp.)	Capital Cost (Mil Rp.)	O/ M Cost (Mil Rp.)	Total Cost (Mil Rp.)	Net Benefit (Mil Rp.)
91					10,425.5		10,425.5	-10,425.5
92					171,421.4		171,421.4	-171,421.4
93					210,937.3		210,937.3	-210,937.3
94					181,098.7		181,098.7	-181,098.7
95					143,462.2		143,462.2	-143,462.2
96					213,947.9		213,947.9	-213,947.9
97					89,624.8		89,624.8	-89,624.8
98	1	292221.2	105.680	30,881.9	185,952.7	689.0	186,641.7	-155,759.8
99	2	380116.1	222.327	84,510.2	90,091.8	1187.4	91,279.2	-6,769.0
00	3	398464.6	149.059	59,394.9		2888.9	2,888.9	56,506.0
01	4	467841.2	137.308	64,238.3		5415.0	5,415.0	58,823.3
02	5	471449.4	190.662	89,887.2		5415.0	5,415.0	84,472.3
|	|	|	|	|	|	|	|
47	50	471449.4	190.662	89,887.2		5415.0	5,415.0	84,472.3

FIRR= 5.05%

Table 3A-13: Cash Flow of FIRR Calculation

(10% lower energy production, 20% lower transfer price, Excluding Resettlement Villages Related Costs)

		Sales Volume (MWh)	Transfer Price (Rp/kWh)	Total Revenue (Mil Rp.)	Capital Cost (Mil Rp.)	O/ M Cost (Mil Rp.)	Total Cost (Mil Rp.)	Net Benefit (Mil Rp.)
91					10,425.5		10,425.5	-10,425.5
92					171,421.4		171,421.4	-171,421.4
93					210,937.3		210,937.3	-210,937.3
94					181,098.7		181,098.7	-181,098.7
95					143,462.2		143,462.2	-143,462.2
96					213,947.9		213,947.9	-213,947.9
97					89,624.8		89,624.8	-89,624.8
98	1	292221.2	105.680	30,881.9	185,952.7	689.0	186,641.7	-155,759.8
99	2	380116.1	222.327	84,510.2	90,091.8	1187.4	91,279.2	-6,769.0
00	3	398464.6	149.059	59,394.9		2888.9	2,888.9	56,506.0
01	4	467841.2	137.308	64,238.3		5415.0	5,415.0	58,823.3
02	5	576215.9	169.477	79,899.8		5415.0	5,415.0	74,484.8
|	|	|	|	|	|	|	|
47	50	576215.9	169.477	79,899.8		5415.0	5415.0	74,484.8

FIRR= 4.47%

Table 3A-14: Cash Flow of FIRR Calculation

(Same energy production, transfer price as Base Case, Including Resettlement Villages Related Costs)

		Sales Volume (MWh)	Transfer Price (Rp./kWh)	Total Revenue (Mil Rp.)	Capital Cost (Mil Rp.)	Resettlement Cost (Mil Rp.)	O/ M Cost (Mil Rp.)	Total Cost (Mil Rp.)	Net Benefit (Mil Rp.)
91					10,425.5	24,323.7		34,749.2	-34,749.2
92					171,421.4	22,231.8		193,653.2	-193,653.2
93					210,937.3	20,664.8		231,602.1	-231,602.1
94					181,098.7	18,854.3		199,953.0	-199,953.0
95					143,462.2	30,749.5		174,211.7	-174,211.7
96					213,947.9	28,095.8		242,043.8	-242,043.8
97					89,624.8	11,317.0		100,941.9	-100,941.9
98	1	299,929.4	105.680	30,881.9	185,952.7	40,425.4	689.0	227,067.0	-196,185.1
99	2	390,463.4	222.327	84,510.2	90,091.8	0.0	1187.4	91,279.2	-6,769.0
00	3	409,521.7	149.059	59,394.9		8,660.3	2888.9	11,549.2	47,845.7
01	4	480,823.4	137.308	64,238.3		13,791.8	5,415.0	19,206.8	45,031.5
02	5	538,368.6	211.846	110,971.9		12,627.7	5,415.0	18,042.7	92,929.2
03	6	538,368.6	211.846	110,971.9		29,536.0	5,415.0	34,951.0	76,020.9
04	7	538,368.6	211.846	110,971.9		10,045.6	5,415.0	15,460.6	95,511.3
05	8	538,368.6	211.846	110,971.9			5,415.0	5,415.0	105,556.9
|	|	|	|	|			|	|	|
47	50	538,368.6	211.846	110,971.9			5,415.0	5,415.0	105,556.9

FIRR= 5.14%

Table 3A-15: Cash Flow of FIRR Calculation

(10% lower energy production, 20% lower transfer price, Including Resettlement Villages Related Costs)

		Sales Volume (MWh)	Transfer Price (Rp./kWh)	Total Revenue (Mil Rp.)	Capital Cost (Mil Rp.)	Resettlement Cost (Mil Rp.)	O/ M Cost (Mil Rp.)	Total Cost (Mil Rp.)	Net Benefit (Mil Rp.)
91					10,425.5	24,323.7		34,749.2	-34,749.2
92					171,421.4	22,231.8		193,653.2	-193,653.2
93					210,937.3	20,664.8		231,602.1	-231,602.1
94					181,098.7	18,854.3		199,953.0	-199,953.0
95					143,462.2	30,749.5		174,211.7	-174,211.7
96					213,947.9	28,095.8		242,043.8	-242,043.8
97					89,624.8	11,317.0		100,941.9	-100,941.9
98	1	299,929.4	105.680	30,881.9	185,952.7	40,425.4	689.0	227,067.0	-196,185.1
99	2	390,463.4	222.327	84,510.2	90,091.8	0.0	1187.4	91,279.2	-6,769.0
00	3	409,521.7	149.059	59,394.9		8,660.3	2888.9	11,549.2	47,845.7
01	4	480,823.4	137.308	64,238.3		13,791.8	5,415.0	19,206.8	45,031.5
02	5	484,531.7	169.477	79,899.8		12,627.7	5,415.0	18,042.7	61,857.1
03	6	484,531.7	169.477	79,899.8		29,536.0	5,415.0	34,951.0	44,948.8
04	7	484,531.7	169.477	79,899.8		10,045.6	5,415.0	15,460.6	64,439.2
05	8	484,531.7	169.477	79,899.8			5,415.0	5,415.0	74,484.8
|	|	|	|	|			|	|	|
47	50	484,531.7	169.477	79,899.8			5,415.0	5,415.0	74,484.8

FIRR= 3.56%

Data Using for Calculating Internal Rate of Return

Table 3A-16: Project's Capital Cost

Year	Project's Capital Cost (Mil Yen) N	Project's Capital Cost (Mil Rs.) C
1990	0	0.0
1991	283	10,425.5
1992	4,522	171,421.4
1993	5,208	210,937.3
1994	4,308	181,098.7
1995	3,303	143,462.2
1996	5,906	213,947.9
1997	2,363	89,624.8
1998	2,431	185,952.7
1999	1,574	90,091.8
2000		
2001		
2002		
2003		
2004		

Table 3A-17: Resettlement Villages Related Cost

Resettlement Related Cost (Mil Rs.) N	Resettlement Related Cost (Mil Rs.) C
8,737	752.9
8,737	640.7
8,737	568.9
8,737	479.8
15,464	749.1
15,464	663.0
6,727	319.6
25,630	1072.4
0	0.0
10,434	151.7
17,230	206.6
17,590	195.9
44,605	501.4
15,171	170.5
45,154	507.6

* In above tables, "N" signifies nominal price, "C" indicates constant price in 1998
* Project's Capital Cost was quoted from the Project Completion Report, which was prepared by PLN 19 October 2001
* Resettlement Related cost was estimated by the SAPS team of the Kotapanjang Hydroelectric Power and Associated Transmission Line Project
* Resettlement Villages Related costs include, such as development and rehabilitation cost of rubber plantation, construction of water supply system and housing for resettlement villages, additional support from ODA loan (construction of water supply system, etc.) Annual resettlement cost (1990-97) is estimated on the basis of the implementation schedule of resettlement and total amount of resettlement cost provided by Provincial Government. The annual resettlement costs from 1999 to 2004 is data provided from Provincial and Regional Governments.

Table 3A-18: Average Transfer Price

	Average Transfer Price (Rs./kWh) N	Average Transfer Price (Rs./kWh) C
1998	105.68	1.382
1999	267.86	3.896
2000	186.22	2.233
2001	191.27	2.135
2002	319.93	3.596

Table 3A-19: O&M Expense

O & M Expense (Mil Rs.) N	O & M Expense (Mil Rs.) C
689.04	689.04
1430.63	1,187.44
3609.11	2,888.91
7543.09	5,414.99

* In above tables, "N" signifies nominal price, "C" indicates constant price in 1998
* O & M Expense (excluding depreciation expense) was collected at PLN Sector Pekanbaru
* Average Electricity Tariff was quoted from the PLN Statistics (1998-2000), and collected at PLN Region III (2001)

Table 3A-20: Operational Data

	Transmission Loss (%)	Gross Energy Production (MWh)	Net Energy Production (MWh)
1998	2.57	301,448.6	299,929.4
1999	2.65	393,223.2	390,463.4
2000	2.70	412,364.7	409,521.7
2001	2.70	483,716.8	480,823.4
2002	2.70	543,000.0	538,368.6

Table 3A-21: Diesel Oil for Private Generator

Unit Price of Diesel Oil (Rs./liter) N	Unit Price of Diesel Oil (Rs./liter) C	Specific Fuel Consumption (liter/kWh)	Unit Price of Diesel Oil (Rs./kWh) C
500.00	500.00	0.37	185.00
500.00	415.01	0.37	153.55
508.33	406.89	0.37	150.55
775.00	556.35	0.37	205.85
1100.00	728.38	0.37	269.50

* In above tables, "N" signifies nominal price, "C" indicates constant price in 1998
* Unit price of diesel oil was quoted from the Jakarta Post 1 October 2000, "Recent Economic Report" Embassy of the USA
* Transmission Loss was collected at PLN UPB Sumbar- Riau (transmission loss in 2002 was estimated by PLN UPB Sumbar- Riau)
* Gross Energy Production in 2002 is quoted from target level gross energy production (for Base Case Calculation).

Table 3A-22: Village Electrification Ratio

	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01
West Sumatra	65.01	66.32	67.58	68.90	69.75	76.04	76.62	79.87	82.73	83.93	84.79	86.05
Riau	13.68	14.74	15.13	16.18	20.42	22.93	26.69	41.14	45.38	45.76	47.21	49.04
Out side Java	25.27	28.97	31.70	35.66	42.92	49.40	55.74	63.25	66.60	71.16	73.39	74.43
Java	50.17	55.65	58.97	62.34	70.99	78.12	86.25	91.35	95.92	99.00	97.55	98.22
İndonesia	34.85	39.23	42.19	45.93	53.72	60.45	67.48	74.06	77.88	81.87	82.69	83.59

Data Source: PLN Rural Electrification Division

Table 3A-23: Consumer Electrification Ratio

	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01
West Sumatra	11.65	13.80	15.02	16.62	18.71	24.49	25.70	27.57	34.14	36.61	38.95	41.42
Riau	5.35	6.58	7.59	8.22	10.13	11.82	14.60	17.09	22.06	24.00	26.61	29.83
Out side Java	9.99	11.53	12.79	14.68	16.86	20.58	24.41	27.96	33.25	36.34	36.91	38.95
Java	18.51	21.51	23.11	25.13	29.68	35.95	42.03	46.40	54.04	59.04	61.59	63.73
Indonesia	14.84	17.22	18.67	20.63	24.17	29.34	34.45	38.47	45.10	49.28	50.98	53.07

Data Source: PLN Rural Electrification Division

Table: 3A-24: Number of Consumers

		Indonesia	Java	Outside Java	Region III	West Sumatra	Riau
1991/92	New Applicants	864,886	503,461	361,425	35,196	19,711	15,485
	Connected	711,679	386,596	325,083	40,598	23,983	16,615
	Waiting	338,988	192,158	146,830	14,004	1,472	12,532
1992/93	New Applicants	1,400,306	1,025,108	375,198	24,349	2,458	21,891
	Connected	870,935	575,426	295,509	8,221	2,767	5,454
	Waiting	670,487	488,215	182,272	19,128	2,691	16,437
1993/94	New Applicants	2,121,736	1,565,202	556,534	59,349	778	58,571
	Connected	1,411,075	968,144	442,931	49,127	16,703	32,424
	Waiting	2,213,481	2,002,824	210,657	11,653	10,222	1,431
1994	New Applicants	1,301,800	882,051	419,749	70,763	42,061	28,702
	Connected	1,085,776	652,984	432,792	56,237	35,650	20,587
	Waiting	720,005	593,599	126,406	14,526	6,411	8,115
1995	New Applicants	2,342,586	1,352,936	989,651	94,249	56,021	38,228
	Connected	1,764,514	946,173	818,340	78,923	46,911	32,012
	Waiting	578,073	406,763	171,310	15,326	9,110	6,216
1996	New Applicants	2,919,301	1,872,531	1,046,770	110,510	59,535	50,975
	Connected	2,508,678	1,637,397	871,281	97,058	54,749	42,307
	Waiting	410,623	235,134	175,489	13,454	4,786	8,668
1997	New Applicants	3,635,104	2,562,246	1,072,858	122,545	67,188	55,357
	Connected	2,783,957	1,829,348	954,609	108,183	62,107	46,076
	Waiting	851,147	732,898	118,249	14,362	5,081	9,281
1998	New Applicants	2,665,554	1,583,541	1,082,013	67,950	36,234	31,716
	Connected	1,792,902	1,185,526	607,376	54,757	31,625	23,132
	Waiting	872,652	398,015	474,637	13,193	4,609	8,584
1999	New Applicants	1,777,722	897,845	879,877	80,497	41,365	39,132
	Connected	1,091,063	621,115	469,948	65,872	36,050	29,822
	Waiting	686,659	276,730	409,929	14,625	5,315	9,310
2000	New Applicants	1,865,274	1,065,592	799,682	114,597	53,329	61,268
	Connected	1,205,757	696,590	509,167	68,763	32,776	35,987
	Waiting	659,517	369,002	290,515	45,834	20,553	25,281

Data Source: PLN Statistic

Table: 3A-25: Connected Capacity of Consumers (Unit: kVA)

		Indonesia	Java	Outside Java	Region III	West Sumatra	Riau
1991/92	New Applicants	2,460,976	1,979,921	481,055	36,942	16,616	20,326
	Connected	805,627	437,422	368,205	37,553	16,307	21,246
	Waiting	2,231,285	1,674,437	556,849	34,209	5,396	28,813
1992/93	New Applicants	4,335,266	3,365,672	969,594	97,838	90,711	7,127
	Connected	1,243,332	905,484	337,848	9,289	1,966	7,323
	Waiting	3,860,559	2,688,233	1,172,326	152,692	88,745	63,947
1993/94	New Applicants	6,681,943	5,221,907	1,460,036	236,571	86,194	150,377
	Connected	2,134,286	1,771,017	363,269	13,685	2,874	10,811
	Waiting	6,559,892	5,259,443	1,300,449	352,160	222,886	129,274
1994	New Applicants	3,656,116	2,980,908	675,208	221,102	110,855	110,247
	Connected	1,824,549	1,449,002	375,547	48,260	28,390	19,870
	Waiting	2,748,262	2,352,595	395,667	172,842	82,465	90,377
1995	New Applicants	3,721,735	2,608,388	1,113,347	191,508	113,831	77,677
	Connected	2,823,161	2,074,732	748,429	78,930	46,916	32,015
	Waiting	4,943,975	4,579,057	364,918	112,578	66,916	45,662
1996	New Applicants	4,473,432	3,266,293	1,207,140	121,823	51,931	69,891
	Connected	3,415,099	2,558,854	856,245	97,339	50,379	46,959
	Waiting	1,058,333	707,438	350,895	24,484	1,552	22,932
1997	New Applicants	7,289,644	5,826,307	1,463,337	247,507	142,263	105,244
	Connected	4,717,492	3,772,821	944,670	133,349	73,679	59,670
	Waiting	2,572,152	2,053,485	518,666	114,158	68,584	45,574
1998	New Applicants	4,836,662	3,779,818	1,056,844	57,145	33,673	23,472
	Connected	34,596	25,862	8,734	914	502	412
	Waiting	4,802,066	3,753,956	1,048,110	56,231	33,171	23,060
1999	New Applicants	5,822,144	4,479,586	1,342,558	156,981	63,872	93,109
	Connected	1,619,554	1,061,111	558,442	71,315	19,814	51,501
	Waiting	4,202,600	3,418,475	784,126	85,666	44,058	41,608
2000	New Applicants	4,007,045	2,632,022	1,375,023	174,194	65,492	108,701
	Connected	2,714,132	1,826,109	888,024	125,103	63,362	61,740
	Waiting	1,292,913	805,913	487,000	49,091	2,130	46,961

Data Source: PLN Statistic

Table 3A-26: Number of Generating Units

		Indonesia	Java	Outside Java	Region III	West Sumatra	Riau	Northern KITLUR	South KITLUR
1990/91	Hydro	138	86	52	10	10			
	Steam	34	24	10	0				
	Gas Turbine	44	26	18	2	2			
	Combined Cycle				0				
	Geothermal	3	3		0				
	Diesel	2938	177	2761	263	101	162		
	Total	3157	316	2841	275	113	162		
1992/93	Hydro	149	92	57	10	10			
	Steam	34	24	10	0				
	Gas Turbine	45	26	19	2	2			
	Combined Cycle	12	12		0				
	Geothermal	3	3		0				
	Diesel	3126	136	2990	280	93	187		
	Total	3369	293	3076	292	105	187		
1993/94	Hydro	148	93	55	10	10			
	Steam	34	24	10	0				
	Gas Turbine	44	27	17	2	2			
	Combined Cycle	27	24	3	0				
	Geothermal	4	4		0				
	Diesel	3238	134	3104	332	116	216		
	Total	3495	306	3189	344	128	216		
1994	Hydro	146	91	55	10	10			
	Steam	35	24	11	0				
	Gas Turbine	49	29	20	5	5			
	Combined Cycle	30	26	4	0				
	Geothermal	6	6		0				
	Diesel	3400	69	3331	337	120	217		
	Total	3666	245	3421	352	135	217		
1995	Hydro	154	94	60	13	13			
	Steam	36	24	12	0				
	Gas Turbine	41	21	20	5	5			
	Combined Cycle	33	27	6	0				
	Geothermal	6	6		0				
	Diesel	3646	107	3539	398	117	281		
	Total	3916	279	3637	416	135	281		
1996	Hydro	143	86	57	10	10			
	Steam	38	24	14	2	2			
	Gas Turbine	45	22	23	7	5	2		
	Combined Cycle	40	34	6	0				
	Geothermal	23	22	1	0				
	Diesel	3479	72	3407	648	504	144		
	Total	3768	260	3508	684	523	161		
1997	Hydro	154	91	63	2	2		13	7
	Steam	38	24	14	0			4	8
	Gas Turbine	50	22	28	0			9	10
	Combined Cycle	40	34	6	0			6	
	Geothermal	6	6		0				
	Diesel	3683	56	3627	514	154	360	56	35
	Total	3971	233	3738	516	156	360	84	60
1998	Hydro	170	96	74	3	3		16	17
	Steam	39	25	14	0			4	8
	Gas Turbine	49	22	27	0			7	10
	Combined Cycle	33	26	7	0			6	
	Geothermal	7	7		0				
	Diesel	3664	90	3574	489	151	338	58	61
	Total	3962	266	3696	492	154	338	91	96
1999	Hydro	177	96	81	3	3		16	17
	Steam	39	25	14	0			4	8
	Gas Turbine	49	22	27	0			9	10
	Combined Cycle	50	40	10	0			6	
	Geothermal	7	7		0				
	Diesel	3731	56	3675	502	140	362	54	61
	Total	4053	246	3807	505	143	362	89	96
2000	Hydro	182	99	83	3	3		16	17
	Steam	39	25	14	0			4	8
	Gas Turbine	47	20	27	0			9	11
	Combined Cycle	54	45	9	0			6	
	Geothermal	7	7		0				
	Diesel	3685	92	3593	490	138	352	46	49
	Total	4014	288	3726	493	141	352	81	85

Source: PLN Statistic 1990/91- 2000

4.1 Rural Electrification Survey

4.1.1 Background

The rural electrification survey was conducted in the villages nearby the project site in order to examine the direct and indirect impact of the project. Although rural electrification or the extension of distribution lines does not include in the project scope, it is regarded as the most important overall goal of the project. That is, the ultimate goal of the project is not simply to fulfill the growing demand for electricity but to increase the electrification ratio in rural areas of n whose electricity is supplied through the substations of Kotapanjang HEPP is estimated to be more than 200 thousand. As shown in Table 4-1, 92 % of consumers are from the residential categories, including both in rural and urban areas. This survey, therefore, seeks to explore extent to which the rural electrification has contributed to improve the living standard of the people in the project area.

Table 4-1: Consumer of Electricity from the Substation s of Kotapanjang HEPP

Substation	No. of Consumer	No of Consumer in Residential category
Pekanbaru substation (50 MVA, 150/20 kV, 2 units)	148,810	135,546 (91%)
Bangkinang substation (10 MVA, 150/20 kV, I unit)	33,826	32,142 (95%)
Kotapanjang substation (10 MVA, 150/20 kV, I unit)	18.148	17,168 (95%)
TOTAL	200,784	184,856 (92%)

Source: Region III

In conducting this interview survey, the major focus was placed on the rural villages where electricity was installed after the project implementation. The rural electrification was conducted by taking 150 sample households from 6 villages. In order to make a comparative study, 50 sample households were also taken from urban area and non-electrified rural area near the project site.

4.1.2 Reduction of Expenses for Light and fuel after Electrification

The average fuel cost for 150 households before electrification was **Rp.29,873** which was reduced to **Rp.22,225** after electrification. As shown in Figure 1, the consumption of diesel was reduced dramatically after the electrification. This is owing to the fact that people stopped using diesel generators after the electrification. Increase in the consumption of kerosene, as shown in Figure 4-1, is due to the rise in the price of kerosene[*1]. In real term, the amount of consumption for kerosene was decreased after

[1] According to the interview with shop dealers and village residences, the price of kerosene rose from Rp.500/lit.to

the electrification.

In rural area, firewood is an importance source of household energy. Firewood is normally collected from the forest be free of charge and is used for cooking. It was observed, however, that the number of respondents using firewood was reduced from 137 to 107 when the electricity was installed. This indicates that, while there are still many households using firewood, economically better-off households now prefer to use kerosene or gas for cooking.

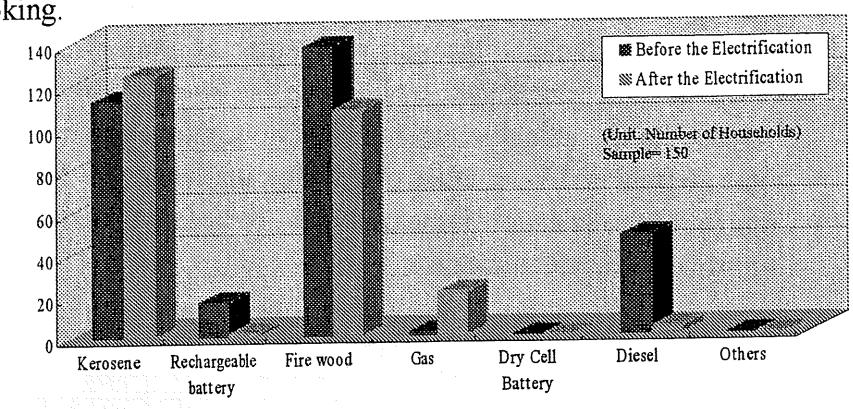


Figure 4-1: Fuel Use before/after Electrification

4.1.3 Purchase of Items before / after Electrification

Figure 4-2 illustrates the timing of purchasing electric items by rural households. Many respondents have already purchased electric items such as lights, TV and irons even before electrification. The majority of respondents used kerosene lamps for lighting before electrification. 52 people replied that they replaced charcoal irons with electric ones after electrification. 53 households who possessed TV before the electrification had access to diesel generators supplied either by private owners or by PLN (i.e., isolated grid system) before electrification. With cheaper and more stable supply of electric power after the connection to PLN transmission system, purchase of these three items, i.e., lights, TV and irons were almost doubled. Purchase of more luxurious items such as videos, electric fans, rice cookers and refrigerators have increased 5 to 7.5 times after electrification.

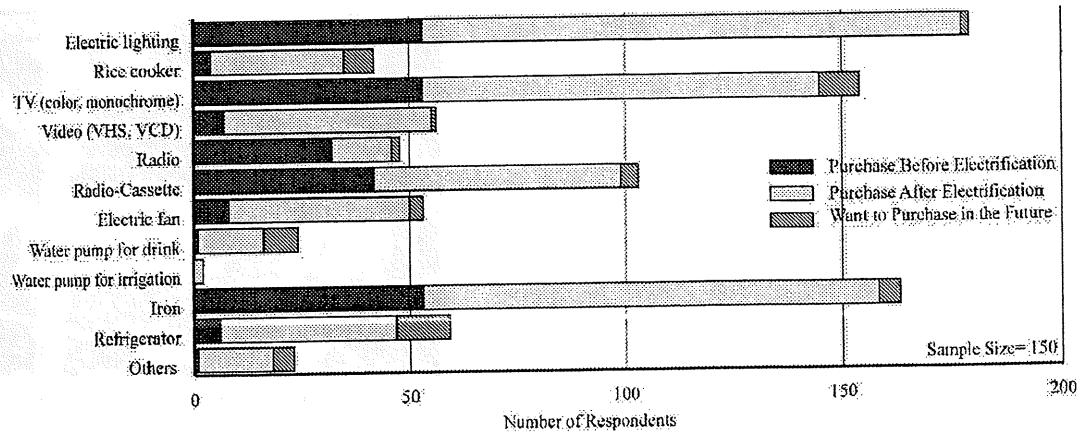


Figure 4-2: Purchase of Electrical Appliances before/after Electrification

Rp.1,500/lit. in 2001

4.1.4 Improving Rural Security and Network

When asked about the positive impact of electrification, many interviewees replied that they feel **'happier'** after the electrification (Figure 4-3). Although nearly one third of respondents had access to diesel generators before the project, they felt more reliable to be connected with the PLN grid transmission system. 48 % of respondents answered that the access to electricity increased their self-confidence. Some answered that the electric light literally brought about the 'brightness' into their family. Furthermore, electrification contributed to improve the social network of village and family. With electric lights, village residents have now more chances to visit one another at night time, watching TV together or chatting until late. 35 % respondents replied that their family communication improved and 33 % felt that their relationship with neighbors improved after electrification.

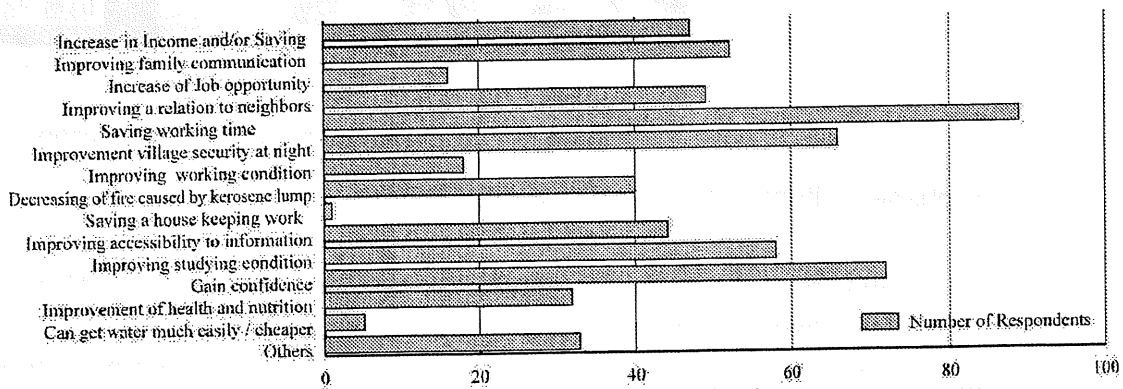
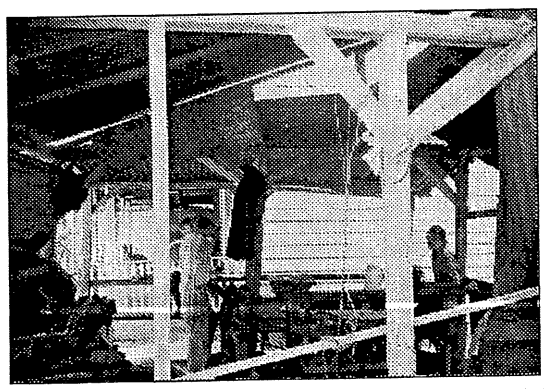


Figure 4-3: Positive Impacts of Rural Electrification (Sample Size=150)

44 % of respondents answered that their village security was improved after electrification. 27 % answered that the incidence of fire caused by kerosene lamps decreased after the electrification. One respondent added that the incidence of thief was also reduced due to the lighting at night. With electricity, therefore, rural life has become physically more secure after electrification.

4.1.5 Increase in Income and Job Opportunity

Electrification has also brought out economic impacts on the consumers. According to the survey, 31% of the respondents experienced increase in income and/or saving, while 11 % answered that they gained opportunities for new jobs.



Home Industry: Timber cutting by using electricity

4.1.6 Saving Working Time/Saving House Keeping Work

Nearly two thirds of respondents marked either 'saving working time' or 'saving

housekeeping work' as a positive impact of the project. As already indicated in the previous analysis, electrification enabled rural households to reduce the burden of such housework as collecting firewood and using charcoal irons. Purchase of refrigerators, water pumps and rice cookers also save time and efforts for housekeeping.

4.1.7 Negative Impact of the Project

Among 150 respondents, one third of the respondents gave negative comments on electrification. 51 interviewees replied that the reduction of sleeping hours is the main negative impact. 17 respondents experienced increased liability, while 11 respondents felt they are losing traditional values. During the interview, one major concern expressed by respondents was the price of electricity tariff. For them, monthly electricity bills often turn out far more expensive than what they actually used. It is caused either by the inaccuracy of electric metering or by the registration of high tariff category (1,300VA) despite their demand of 450 VA or 900 VA. Nevertheless, none of the respondents intend to terminate their electric contract, as electricity has already occupied an important part of their live.

4.2 Urban Electrification

Urban area of Pekanbaru has been electrified by the PLN isolated system, based on diesel generators, since early 1980s. With the implementation of Kotapanjang HEPP project, new substations were constructed through which low voltage electricity was distributed to consumers in Pekanbaru. Consumers in Pekanbaru were connected with the grid transmission system of PLN after the completion of Kotapanjang HEPP project.

As shown in Figure 4, 31 out of 50 respondents experienced better stability of voltage as compared with before. When electricity was supplied through diesel generators of isolated system, the voltage tended to fluctuate a lot during the peak time at night. According to the respondents, instability of voltage often caused breakdown of diesel generators as well as electric equipments used at home.

4.3 Non-Electrified Rural Villages

A brief questionnaire survey was conducted in two non-electrified villages near the project site: Bukit Talao in West Sumatra Province and Deli Makmur in Riau. When asked about the Willingness to Pay (WTP) for future electric charges, 15 out of 50 respondents answered that they are ready to pay in accordance with the PLN's norm. The average amount of WTP among the rest of respondents was Rp.778,571 for connection fees and Rp.38,441 for monthly tariff. Whatever the level of electric costs, all respondents assumed that their current expenses for fuel could be lower after the

connection with the PLN transmission system. Although not electrified by the PLN transmission system, the village Deli Makmur possesses its own diesel generator through which electricity is supplied in all households. This diesel generator was purchased at villager's own expenses and the minimum electric tariff per month (for two lamps plus television) is reported to be Rp.75.000. Electric charge in Deli Makmur is considerable provided that the average tariff paid by 150 electrified households was Rp.57,000. Though already electrified by their private source, the residents in Deli Makmur are applying for the PLN transmission, hoping that it will bring them better and cheaper supply of electricity.

4.4 Constraints on Rural Electrification

In general, the Kotapanjang HEPP project has improved rural electrification rate of the project area. Table 4-2 shows the rural electrification rate of 6 villages in which the survey was conducted. In Koto Alan, a village in West Sumatra Province, the electrification rate was less than 5 % the connection with the transmission system. Although the village had a diesel generator provided by PLN, its use was limited to public offices, mosque and upper class residents. When the line was connected in 1999, the electrification rate rose up to 15 % and 91 households are now electrified by the PLN grid system.

Table 4-2: Rural Electrification Ratio of Villages

Village	District/ Province	Total (H/Hs)	Electrified (H/Hs)	Electrification ratio
Koto Alan	50 Kota/ W. Sumatra	675	91	15 %
Banjar Ranah	50 Kota/ W. Sumatra	236	39	16.5 %
Banjar Batu	50 Kota/ W. Sumatra	550	77	14 %
Kashikan	Kampar/ Riau	700	218	31 %
Patapahan	Kampar/ Riau	500	100	20 %
Ganting Damai	Kampar/ Riau	327	140	42.8 %

Source: Interview Survey

Given that the rural electrification rate in the whole country is 42.6 % (as of December 1992), the electrification rate in these 6 villages still remain low. Among 6 villages, the electrification rate marked less than 20 % in 4 villages. While the electrification ratio before the project is not known, the reasons for the low electrification rate in these villages can be explained as follows:

1) The village electrification rate depends primarily on the distance from the transmission lines. Distribution of electric cables normally starts from the main road and gradually spread inside the village. Remote settlements or isolated households have the least priory for electrification.

2) Limited number of transmission lines and electric current dividers (transformers) are

supplied by PLN at one time.

3) In rural area, three different tariff categories are applied according to the different contracted power: 450VA (Rp.4,588/kVA/month), 900VA (Rp.4,633/kVA/month), and 1300va-2,200VA (Rp.11,500/kVA/month). Majority of surveyed households were supplied with 1,300VA despite their requirement level of 450VA or 900VA. This is mainly due to the PLN regulation to restrict the number of low tariff category (450VA or 900VA) in order to maintain its financial viability. Unable to pay for high electricity tariff, village applicants keep waiting for a long time to receive electricity by low tariff category.

4.5 Flood Impacts Originated from Impounding of the Reservoir

4.5.1 Floods in the Pangkalan Kotabaru (upstream of the reservoir)

Pangkalan Kotabaru is located along the Mahat River about 49 km upstream from the dam site, and about 4km away from the ending point of the reservoir (44.90 km from the dam site). After impounding the reservoir in 1997, the village suffered from flooding on 2nd February 1998, and 6 January 1998. Center of flood area at the village was Pangkalan Kotabaru bridge (49.15 km away from the dam site). Some of the residents in the village believed the floods were occurred due to backwater effect[*2] of the reservoir.

In order to examine the reasons of the floods, flood impacts study[*3] was conducted in 2000 with the financial help of JBIC. During the field survey conducted at the study, the study team interviewed to the residents in Pangkalan Kotabaru. According to the information gathered from residents, floods in the village had been occurred since a past, nearly every year during the heavy rainy season (December- February) with various flood scale. The recorded big scale flood years by the residents were year 1961, 1968, 1972, 1978, 1991, and 1998.

Under the survey, in order to determine an influence of reservoir backwater effect to Pangkalan Kotabaru flood, calculation of influence length of backwater effect is conducted by comparing before and after filling the reservoir in two flood discharge cases (3,000 m^3/sec[*4] and 8,000 m^3/sec[*5]). At that time, Bernoulli formula, Manning formula and Standard Step method were applied for calculating backwater effect.

As a result of calculation, the report concluded relation of the flood in Pangkalan Kotabaru and impounding of the reservoir as follows:

1. As a result of calculation, backwater ended at 45.30 km (flood discharge of 3,000

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[2] Backwater effect: The effect which a dam or other obstruction has in raising the surface of the water upstream from it.

[3] "A study for Mitigation of Annual Flood Impacts in Pangkalan Kotabaru 50 Kota Regency, West Sumatra Province" Final Report, April 2000, prepared by Tokyo Electric Power Services Co. Ltd. and P.T. Modulatama Intikreasi, The survey was conducted with the financed by the JIBC. Information in section 4.5.1 is mostly quoted from the report.

[4] 3,000 m^3/sec was considered equivalent to the flood scales occurred on 6th January 1998 and on 2nd February 1998.

[5] 8,000 m^3/sec is equivalent to a design flood of the Kotapanjang project of 200 years return period.

m^3/sec), and 46.55 km (flood discharge of 8,000 m^3/sec) away from the dam site. Thus, the existence of Kotapanjang reservoir, which is caused backwater effect, does not reach Pangkalan Kotabaru.

2. Special topographic feature and abrupt river change[*6] at Pangkalan Kotabaru Bridge and the strong rainfall intensity within the catchment area were judged as main factors which caused flood occurrence.

3. Actual capacity of tributaries of the Mahat River which are functioned as flood drainages, are considered far than enough to accommodate flood discharge from their owned catchment area.

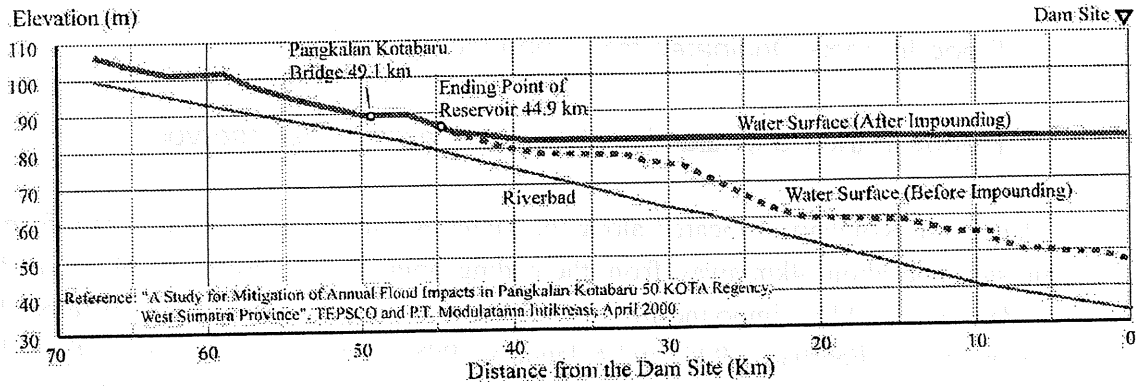

Figure 4-4: Water Surface Profile of Reservoir along the Mahat River (Discharge= 3,000m^3/sec)

4.5.2 Floods in downstream of the Kotapanjang Dam

Before implementation of the project, some places in downstream of the dam site (e.g.: Rantau Berangin, Danau Bingkuang) were suffered from frequent floods. However, after construction of the Kotapanjang dam, water discharge from the dam became much stable. As a result, according to the information gathered from project site, no flood has occurred along the downstream of the dam site since completion of the dam.

4.6 Other Impacts

4.6.1 Impact on Tourism

Since the completion of the project, the Government of Riau has been attempting to promote tourism in Kotapanjang area. Kotapanjang Lake, developed for the construction of hydroelectric power plant, has been the one of the main tourist attractions of Riau Province

[6] Bottle neck effect due to river narrow at about 1,300 km in the downstream of steel truss bridge of Pangkalan Kotabaru located in Pangkalan Timur village. The flood discharge contributed by Mahat River and its tributaries was detained at entrance point of river narrow, then the flood flow ran slowly to the downstream and upstream water level was rapidly increased.

together with Muara Takus Temple.

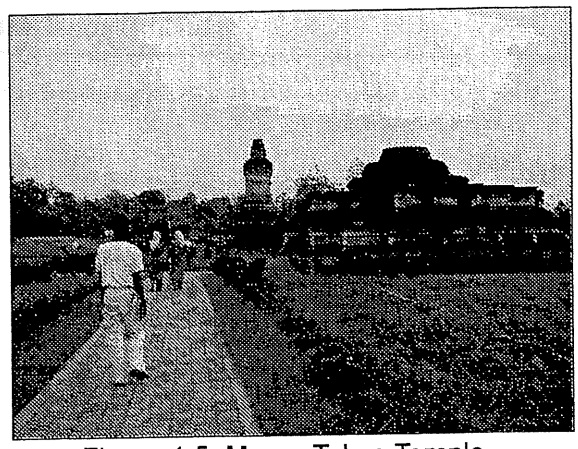

Figure 4-5: Muara Takus Temple

Muara Takus Temple is located in Muara Takus village, 135 km from Pekanbaru, established at the edge of Kampar Kanan river. The existence of this Buddhist temple at the height of 86.25m was one of the reasons for changing the water level of the reservoir from EL 100m to EL 85m during the feasibility study[*7]. The history of Muara Takus Temple is veiled in mystery; some state that it was built around the 11th, 9th, 7th century, even some are of the opinion around the 4th century AD. The temple is also believed to have been the symbol of Sriwijaya Empire. Excavation work is still being made to determine the precise age of the temple.

For the promotion of tourism, the temple underwent overall restorations between 1978 and 1992 by the financial assistance of UNESCO. The number of visitors after the restoration increased rapidly; from 500-1,000 visitors per year before the restoration[*8] to 10,006 in 2000 and 7,012 in 2001[*9]. Besides the promotion by the Government, there are increasing number of small shops and restaurants are opened near the dam site and Muara Takus Temple taking advantages of their locations.

4.6.2 Fishery

Increase in the population engaged in fishery is another indirect impact of the project. As a part of Action Plan for resettled villages, Fishery Department, in collaboration with PLN and Riau University, currently implements 20 small pilot projects by providing 200 units of floating nets in the Kotapanjang Lake. Though the number is unknown, beneficiaries of this programme are the farmers from the relocated villages and they do fishing as secondary occupation. Apart from the organized fisheries, individual farmers are also engaged in fishing for their side job. Major varieties of fish bred in the lake include Mas (Cyprinio carpio), Tawes (Puntius gonionotus), Gurami (Osphron gourami) and Patin (Pangasius pangasius). Through fishery, therefore, the implementation of Kotapanjang HEPP project indirectly contributed to enhance income opportunities for the people living around the lake.

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[7] See Feasibility Study of Kotapanjang Hydroelectric Power Plant, Indonesia, 1984: Japan International Cooperation Agency. (Japanese version page IV-28~29)

[8] Feasibility Study of Kotapanjang Hydroelectric Power Plant, Indonesia, 1984: Japan International Cooperation Agency. (Japanese version page IV-29)

[9] Information collected from the Registration book of Muara Takus Temple

Interview Questionnaire for KOTAPANJANG HYDROELECTORIC POWER PLANT AND ASSOCIATED TRANSMISSION PROJECT (Rural Electrification : Electrified)

1. Rural Electrification (Electrified Households Sample no.=150)

A. Personal Information

A-1. Interviewee's name
(See data sheet)

A-2. Interviewee's gender
? Male
? Female

Resp	%
101	67%
49	33%
150	100%

A-3. Interviewee's age
? '< 30
? 31-40
? 41-50
? 51-60
? > 60

no.	%
28	19%
59	39%
36	24%
13	9%
14	9%
150	100%

A-4. Number of persons in house
? 1 - 4
? 5 - 6
? 7- 8
? > 10

no.	%
43	29%
55	37%
36	24%
16	11%
150	100%

A-5. Village
? Koto Alam
? Banjar Ranah
? Gn Malintang
? Kasikan
? Patapahan
? Ganting Damai

Resp	%
29	19%
21	14%
24	16%
26	17%
25	17%
25	17%
150	100%

A-6. Type of Housing
(See data sheet)

A-7. House Ownership Status :..... Families
? Own house and land
? Own house and rent land
? Own house and squatted land
? Rent house and land
? Others

Resp	%
121	81%
2	1%
16	11%
5	3%
6	4%
150	100%

A-8 Main Income Source (1st)
? Agriculture
? Commerce
? Salary / Wage
? Self-employ
? Livestock
? Fishery
? Remittance
? Others

Resp	%
98	65%
15	10%
10	7%
2	1%
1	1%
4	3%
0	0%
20	13%
150	100%

A-8 Main Income Source (2nd)
? Agriculture
? Commerce
? Salary / Wage
? Self-employ
? Livestock
? Fishery
? Remittance
? Others

Resp	%
8	19%
7	16%
14	33%
1	2%
3	7%
3	7%
6	14%
1	2%
43	100%

A-8 Main Income Source (3rd)

? Agriculture
? Commerce
? Salary / Wage
? Self-employ
? Livestock
? Fishery
? Remittance
? Others

Resp	%
1	25%
0	0%
0	0%
0	0%
0	0%
0	0%
1	25%
2	50%
4	**100%**

A-9. Amount of income of the household per month, Rp.....

- ☐ 0 – 20,000
- ☐ 20,001 – 50,000
- ☐ 50,001 – 100,000
- ☐ 750,000 – 1,000.000
- ☐ 100,001 – 200,000
- ☐ 200,001 – 500,000
- ☐ 500,001 – 1,000,000
- ☐ **More than** 1,000,000

Resp	%
0	0%
0	0%
0	0%
0	0%
26	17%
86	57%
38	25%
0	0%
150	**100%**

B. Usage Condition of Electricity and expense for the Energy

B-1. Date of Electrification in House

- ☐ 1999
- ☐ 2000
- ☐ 2001
- ☐ 2002

Resp	%
22	15%
75	50%
50	33%
3	2%
150	**100%**

B-2. Before the electrification, what are the main source of energy (lighting, cooking, etc.,)

- ☐ Kerosene
- ☐ Rechargeable battery
- ☐ Fire wood
- ☐ Gas
- ☐ Dry Cell Battery
- ☐ Diesel
- ☐ Electricity from private company
- ☐ Others

N = 150

Resp	Purpose	Average Cost of user	%
112	Light	Rp.14,291	75%
16	Light	Rp. 13,555	11%
137	Cook	free	91%
1	Cook	Rp .35,000	1%
0	0	0	0%
47	TV, Light	Rp51,298	31%
0	0	0	0%
0	-	0	0%
313	-	-	-

B-3. After the electrification, what are the main source of energy (lighting, cooking, etc.,)

- ☐ Kerosene
- ☐ Rechargeable battery
- ☐ Fire wood
- ☐ Gas
- ☐ Dry Cell Battery
- ☐ Diesel
- ☐ Electricity from private company
- ☐ Others

N = 150

Resp	Purpose	Average Cost.of user	%
124	Light	Rp.16,854	83%
1	Light	Rp. 4,000	1%
107	Cook	free	71%
20	Cook	Rp .37,665	13%
0	0	0	0%
3	TV, Light	Rp96,333*	2%
0	0	0	0%
0	-	0	0%
255	-	-	-

* One household spends Rp. 240,000 for diesel for commercial purpose

B-4. How is condition of distribution facilities in your area (like wiring, etc.,)?

- ☐ Good
- ☐ Fair
- ☐ Poor

Resp	%
56	37%
64	43%
30	20%
150	**100%**

B-5. After electrification, how much do you pay for the electricity tariff: .....Rs./month

N = 150

Tariff/Month (Rp)	Resp	%
☐ ≤ 10,000	3	2%
☐ 10,000 - 30,000	38	25%
☐ 30,000 - 50,000	43	29%
☐ 50,000 - 70,000	23	15%
☐ 70,000 - 90,000	22	15%
☐ ≥ 90,000	21	14%
	150	**100%**

Kw/hour

- ☐ ≤50
- ☐ 50 - 100
- ☐ 100 - 150
- ☐ 150 - 200
- ☐ 200 - 250
- ☐ ≥ 250

N = 150

Resp	%
30	20%
29	19%
31	21%
29	19%
15	10%
16	11%
150	**100%**

B-6. What were your performance and attitudes about payment of electricity tariff?

- ☐ Always on schedule
- ☐ Sometime delay
- ☐ Always delay
- ☐ Non payment

N = 150

Resp	%
147	98%
3	2%
0	0%
0	0%
150	**100%**

B-7. What were the reasons of non-payment/delay-payment of Electricity tariff?

- ☐ Inadequate supply of Energy
- ☐ Lack of delay of information un fee collection
- ☐ Incomplete or unclear bills
- ☐ No sufficient net income to pay electricity tariff
- ☐ Bad accessibility to the customer service and/or payee
- ☐ Others (specify :.....

N = 150

Resp	%
0	0%
0	0%
2	1%
1	1%
0	0%
0	0%
3	**2%**

B-8. If the price is more reasonable, will you consider to pay for electricity?

- ☐ Yes
- ☐ No

N = 3

Resp	%
3	100%
0	0%
3	**100%**

☐ If Yes, how much are you willing to pay for the connection fee and tariff?

- ☐ Connection Fee
- ☐ Tariff

N = 3

Resp	Rp.
3	550,000
3	41,677
-	-

C. Impact the Electrification Project

C-1. What kind of Electric facilities is in your household ? (please mark each applicable items)

N = 150

Item	Purchase **Before** electrification		Purchase **After** electrification		Want to purchase in the future	
	Sum	%	Sum	%	Sum	%
☐ Electric lighting	53	35%	124	83%	2	1%
☐ Rice cooker	4	3%	31	21%	7	5%
☐ TV (color, monochrome)	53	35%	92	61%	9	6%
☐ Video (VHS, VCD)	7	5%	48	32%	1	1%
☐ Radio	32	21%	14	9%	2	1%
☐ Radio-Cassette	42	28%	57	38%	4	3%
☐ Electric fan	8	5%	42	28%	3	2%
☐ Water pump for drink	1	1%	15	10%	8	5%
☐ Water pump for irrigation	0	0%	2	1%	0	0%
☐ Iron	53	35%	105	70%	5	3%
☐ Refrigerator	6	4%	41	27%	12	8%
☐ Others (.....)	1	1%	17	11%	5	3%
☐ Others (.....)	0	0%	0	0%	0	0%
	260	-	588	-	58	-

C-2. How long do you watch a TV per day on the average?

- ☐ Before the electrification.....hours/day
  - ☐ < 2 Hours
  - ☐ 2 - 5 Hours
  - ☐ > 5 Hours

N = 75

Resp	%
36	48%
32	43%
7	9%
75	100%

N = 129

- ☐ After the electrification.....hours/day
  - ☐ < 3 Hours
  - ☐ 4 - 6 Hours
  - ☐ > 6 Hours

Resp	%
24	19%
67	52%
38	29%
129	100%

C-3. Has the electrification changed to your lifestyle? (please enter time of each item)

See data sheet

C-4. Has electrification contributed to the improvement of the living standard (including the change of lifestyle) of the target population

a) Positive impact:

N = 150

- ☐ ***There have been positive impact:***
  - ☐ Increase in Income and/or Saving
  - ☐ Improving family communication
  - ☐ Increase of Job opportunity
  - ☐ Improving a relation to neighbors
  - ☐ Saving working time
  - ☐ Improvement village security at night
  - ☐ Improving working condition
  - ☐ Decreasing of fire caused by kerosene lump
  - ☐ Saving a house keeping work
  - ☐ Improving accessibility to information
  - ☐ Improving studying condition
  - ☐ Gain confidence
  - ☐ Improvement of health and nutrition
  - ☐ Can get water much easily / cheaper
  - ☐ Others

Resp	%
47	31%
52	35%
16	11%
49	33%
89	59%
66	44%
18	12%
40	27%
1	1%
44	29%
58	39%
72	48%
32	21%
5	3%
33	22%
622	-

(2) Negative Impact:

N = 150

- ☐ ***There have been Negative Impact:***
  - ☐ Increasing of Liability
  - ☐ Losing traditional sense of values
  - ☐ Increasing a working time
  - ☐ Increasing a house keeping work
  - ☐ Decreasing of study time
  - ☐ Lose confidence
  - ☐ Declining in family communication
  - ☐ Decreasing of sleeping hours
  - ☐ Declining a relation to neighbors
  - ☐ Others (.....)

Resp	%
17	11%
11	7%
1	1%
0	0%
6	4%
0	0%
0	0%
51	34%
1	1%
44	29%
131	87%

*** * * Thank you very much for Your information* * ***

Interview Questionnaire for KOTAPANJANG HYDROELECTORIC POWER PLANT AND ASSOCIATED TRANSMISSION PROJECT (Urban Electrification)

1. Urban Electrification (Electrified households Sample no.=150)

A. Personal Information

A-1. Interviewee's name
(See data sheet)

A-2. Interviewee's gender
? Male
? Female

Resp	%
28	56%
22	44%
50	100%

A-3. Interviewee's age
? '< 30
? 31-40
? 41-50
? 51-60
? '> 60

no.	%
3	6%
13	26%
16	32%
13	26%
5	10%
50	100%

A-4. Number of persons in house
? 1 - 4
? 5 - 6
? 7- 8
? '> 10

no.	%
20	40%
22	44%
8	16%
0	0%
50	100%

A-4'. Town
? Kel.Limbungan
? Kel.Sido Mulyo

Resp	%
29	58%
21	42%
50	100%

A-5. House Ownership Status
? Own house and land
? Own house and rent land
? Own house and squatted land
? Rent house and land
? Others

Resp	%
44	88%
0	0%
0	0%
5	10%
1	2%
50	100%

A-6 Main Income Source (1st)
? Agriculture
? Commerce
? Salary / Wage
? Self-employ
? Livestock
? Fishery
? Remittance
? Others

Resp	%
2	4%
4	8%
2	4%
3	6%
0	0%
0	0%
0	0%
37	77%
48	100%

A-6 Main Income Source (2nd)
? Agriculture
? Commerce
? Salary / Wage
? Self-employ
? Livestock
? Fishery
? Remittance
? Others

Resp	%
0	0%
1	11%
0	0%
2	22%
0	0%
0	0%
2	22%
4	44%
9	100%

A-6 Main Income Source (3rd)

Resp	%
0	-

A-7. Amount of income of the household per month, Rp.....
□ 0 – 20,000
□ 20,001 – 50,000
□ 50,001 – 100,000
□ 750,000 – 1,000.000
□ 100,001 – 200,000
□ 200,001 – 500,000
□ 500,001 – 1,000,000
□ More than 1,000,000

Resp	%
44	88%
0	0%
0	0%
0	0%
5	10%
0	0%
0	0%
1	2%
50	100%

B. Usage Condition of Electricity and expense for the Energy

B-1. Date of Electrification in House

- ☐ <1982
- ☐ 1983 - 1985
- ☐ 1985 - 1990
- ☐ >1990

Resp	%
30	60%
11	22%
4	8%
5	10%
50	**100%**

B-2. How is condition of distribution facilities in your area (like wiring, etc.,)?

- ☐ Good
- ☐ Fair
- ☐ Poor

Resp	%
23	46%
20	40%
7	14%
50	**100%**

B-3. Do you feel any improvement in electrical condition in your town / house when the transmission line between Kotapanjang and

N= **50**

- ☐ Less load shedding
- ☐ Less power cut
- ☐ Better stability
- ☐ More houses have electricity
- ☐ Increased number of street lamp
- ☐ Others

Resp	%
9	18%
6	12%
31	62%
14	28%
12	24%
11	22%
83	**166%**

B-4. How much do you pay for the electricity tariff per month? What is kw/hour consumption of electricity according to your bill?

N = **50**

Tariff/Month (Rp)

- ☐ ≤ 20,000
- ☐ 20,000 - 40,000
- ☐ 40,000 - 60,000
- ☐ 60,000 - 80,000
- ☐ 80,000 - 100,000
- ☐ ≥ 100,000

Resp	%
4	8%
11	22%
10	20%
11	22%
4	8%
10	20%
50	**100%**

N = **50**

Kw/hour

- ☐ <100
- ☐ 100 - 150
- ☐ 150 - 200
- ☐ 200 - 250
- ☐ 250 - 300
- ☐ ≥ 300

Resp	%
6	12%
8	16%
9	18%
8	16%
4	8%
15	30%
50	**100%**

C. Impact the Electrification Project

C-1. What kind of Electric facilities is in your household ? (please mark each applicable items)

N = **50**

Item	Purchase Before electrification		Purchase After electrification		Want to purchase in the future	
	Sum	%	Sum	%	Sum	%
☐ Electric lighting	48	96%	19	38%	0	0%
☐ Rice cooker	12	24%	24	48%	1	2%
☐ TV (color, monochrome)	48	96%	19	38%	2	4%
☐ Video (VHS, VCD)	9	18%	26	52%	0	0%
☐ Radio	2	4%	4	8%	0	0%
☐ Radio-Cassette	32	64%	11	22%	0	0%
☐ Electric fan	33	66%	22	44%	1	2%
☐ Water pump for drink	16	32%	22	44%	0	0%
☐ Water pump for irrigation	0	0%	1	2%	0	0%
☐ Iron	28	56%	13	26%	0	0%
☐ Refrigerator	33	66%	27	54%	2	4%
☐ Computer	1	2%	10	20%	8	16%
☐ Facsimile	0	0%	1	2%	2	4%
☐ Microwave	0	0%	2	4%	2	4%
☐ Others (.....)	3	6%	17	34%	2	4%
☐ Others (.....)	0	0%	2	0%	0	0%
	265	-	220	-	20	-

C-2.As compared with 5 years ago, did your life style change?
See data sheet

C-3. How long do you watch a TV per day on the average?

N = 37

Resp	%
4	11%
12	32%
14	
7	19%
37	62%

☐ Before 5 years
- ☐ < 3 Hours
- ☐ 3 - 5 Hours
- ☐ 5 - 7 Hours
- ☐ > 7 Hours

N = 48

Resp	%
4	8%
9	19%
12	25%
23	48%
48	100%

☐ Present
- ☐ < 3 Hours
- ☐ 3 - 5 Hours
- ☐ 5 - 7 Hours
- ☐ > 7 Hours

C-4. Do you think the Kotapanjang Hydroelectric Power Plant Project has improved your living standard?
(Not asked due to the mis-translation)

C-5. What kind of impacts do you think the project has brought into the living standards of the target population and / or population in

a) Positive impact:

N = 150

Resp	%
10	7%
19	13%
14	9%
15	10%
33	22%
27	18%
16	11%
14	9%
3	2%
17	11%
19	13%
21	14%
15	10%
16	11%
22	15%

☐ ***There have been positive impact:***
- ☐ Increase in Income and/or Saving
- ☐ Improving family communication
- ☐ Increase of Job opportunity
- ☐ Improving a relation to neighbors
- ☐ Saving working time
- ☐ Improvement village security at night
- ☐ Improving working condition
- ☐ Decreasing of fire caused by kerosene lump
- ☐ Saving a house keeping work
- ☐ Improving accessibility to information
- ☐ Improving studying condition
- ☐ Gain confidence
- ☐ Improvement of health and nutrition
- ☐ Can get water much easily / cheaper
- ☐ Others

(2) Negative Impact:

N = 50

Resp	%
0	0%
9	18%
0	0%
0	0%
1	2%
0	0%
0	0%
13	26%
0	0%
4	8%
27	54%

☐ ***There have been Negative Impact:***
- ☐ Increasing of Liability
- ☐ Losing traditional sense of values
- ☐ Increasing a working time
- ☐ Increasing a house keeping work
- ☐ Decreasing of study time
- ☐ Lose confidence
- ☐ Declining in family communication
- ☐ Decreasing of sleeping hours
- ☐ Declining a relation to neighbors
- ☐ Others (.....)

*** * * Thank you very much for Your information* * ***

Interview Questionnaire for KOTAPANJANG HYDROELECTORIC POWER PLANT AND ASSOCIATED TRANSMISSION PROJECT (Rural Electrification : Non Electrified)

1. Rural Electrification (Non Electrified Households Sample no.= 50)

A. Personal Information

A-1. Interviewee's name
(See data sheet)

A-2. Interviewee's gender
? Male
? Female

Resp	%
40	80%
10	20%
50	100%

A-3. Interviewee's age
? '< 30
? 31-40
? 41-50
? 51-60
? '> 60

no.	%
8	16%
18	36%
14	28%
7	14%
3	6%
50	100%

A-4. Number of persons in house
? 1 - 4
? 5 - 6
? 7- 8
? '> 10

no.	%
23	46%
18	36%
6	12%
3	6%
50	100%

A-5. Village
? Bukit Talao
? Banjar Ranah

Resp	%
25	50%
25	50%
50	100%

A-6. Type of Housing
(See data sheet)

A-7. House Ownership Status
? Own house and land
? Own house and rent land
? Own house and squatted land
? Rent house and land
? Others

Resp	%
47	94%
0	0%
0	0%
0	0%
3	6%
50	100%

A-8 Main Income Source (1st)
? Agriculture
? Commerce
? Salary / Wage
? Self-employ
? Livestock
? Fishery
? Remittance
? Others

Resp	%
98	65%
15	10%
10	7%
2	1%
1	1%
4	3%
0	0%
20	13%
150	100%

A-8 Main Income Source (2nd)
? Agriculture
? Commerce
? Salary / Wage
? Self-employ
? Livestock
? Fishery
? Remittance
? Others

Resp	%
48	96%
0	0%
1	2%
0	0%
0	0%
0	0%
0	0%
1	2%
50	100%

A-8 Main Income Source (3rd)

? Agriculture
? Commerce
? Salary / Wage
? Self-employ
? Livestock
? Fishery
? Remittance
? Others

Resp	%
0	0%
0	0%
0	0%
0	0%
0	0%
0	0%
0	0%
3	100%
3	**100%**

A-9. Amount of income of the household per month, Rp.....

- ☐ 0 – 20,000
- ☐ 20,001 – 50,000
- ☐ 50,001 – 100,000
- ☐ 750,000 – 1,000.000
- ☐ 100,001 – 200,000
- ☐ 200,001 – 500,000
- ☐ 500,001 – 1,000,000
- ☐ **More than** 1,000,000

Resp	%
0	0%
0	0%
0	0%
0	0%
11	22%
21	42%
18	36%
0	0%
50	**100%**

B. Usage Condition of Electricity and expense for the Energy

N = **50**

B-1. What are the main source of energy (lighting, cooking, etc.,)

- ☐ Kerosene
- ☐ Rechargeable battery
- ☐ Fire wood
- ☐ Gas
- ☐ Dry Cell Battery
- ☐ Diesel
- ☐ Electricity from private company
- ☐ Others

Resp	Purpose	Average Cost of user	%
42	Light	Rp.42,743	84%
4	Light	Rp. 9,000	8%
43	Cook	free	86%
3	Cook	Rp .55,833	6%
0	-	0	0%
29	TV, Light	Rp46,586	58%
0	-	0	0%
0	-	0	0%
121	-	**0**	-

B-2. If electrified, how much are you willing to pay for the electricity tariff: .....Rest./month

N = **50**

Connection fee (Rp)

- ☐ ≤ 500,000
- ☐ 500,000 - 1,000,000
- ☐ '> 1,500,000
- ☐ as per PLN norm

Resp	%
15	30%
13	26%
7	14%
15	30%
50	**100%**

N = **50**

Tariff/Month (Rp)

- ☐ <25,000
- ☐ 25,000 - 50,000
- ☐ '> 50,000
- ☐ as per PLN norm

Resp	%
17	34%
15	30%
2	4%
16	32%
50	**100%**

*** * * Thank you very much for Your information* * * ***

Chapter 5 Sustainability

5.1 Change in the O&M Agency with Restructuring of Power Sector in Sumatra

5.1.1 Restructuring and Privatization of PLN in Java- Bali Area

The Indonesia Government intended to introduce commercial mechanism particularly into Java-Bali area. As a first step for implementing this strategy, PLN's generation related assets were transferred to two PLN's subsidiary companies, namely PT Indonesia Power and PT Power Generation Java-Bali. Transmission related function was also transferred to P3B (Java-Bali Transmission Company). The company has the responsibility to purchase electricity from all generating companies connected to the grid on behalf of the distribution units, and then sold electricity to the distribution units. In case of distribution business in Java- Bali, PLN is currently preparing five decentralized strategic business units for distribution business in Java-Bali.

While the privatization strategy for two generation companies and four distribution units shall be implemented after the companies reaches a condition of being able to produce profit, transmission business will remain under public control.

5.1.2 Restructuring of Power Sector in Sumatra Island

The outside Java is divided by PLN into 11 administrative regions, and there are 11 PLN regional offices. PLN's Regional Offices (hereafter PLN Region or Region) were in charge of generation, transmission, and distribution functions within their commanded area. In case of Sumatra Island, there are four PLN Regions. All four PLN Regions in Sumatra also used to play vertically integrated rolls in power sector.Medium-scale grid transmission systems have developed in Sumatra, recently. To coop with the development of the grid system in the island, PLN established two generation and transmission business units, namely North KITLUR and South KITLUR in 1997. KITLURs are responsible for operation, maintenance, and management of grid transmission systems and its linked power stations. On the other hand, PLN Regions are currently responsible for distribution service and customer service as well as operation and maintenance of isolated diesel power stations. PLN Regions sell electricity, which generated by their own isolated diesel power stations, to consumers within their commanded province. In addition PLN Regions received electricity from KITLUR's grid system and then sell to consumers through their interconnected distribution system.

5.1.3 Organization for Operation and Maintenance of the Project Facilities

The operation, maintenance and management of the Kotapanjang HEPP executed under the responsibility of the North KITLUR. North KITLUR consists of headquarter

in Medan, number of sector offices, and a few load dispatching centers called UPB[*1]. Actual operation and maintenance of the power station is carried out by the power stations staffs under the supervision of the Sector Pekanbaru. As of April 2002, the power station had 36 employees, including 18 personnel in the operation section, and 14 personnel in the maintenance section. Operation was executed by 4 groups in three shifts under the supervision of one chief engineer and one operation manager. Each operation group consists of four staffs.

Sector Pekanbaru is also responsible for operation and maintenance for the transmission lines and substations of Kotapanjang - Bangkinang - Pekanbaru. Transmission line of Payakumbuh - Kotapanjang section is operated and maintained by Sector Padang.

5.2 Capability of Operation and Maintenance

5.2.1 Training Program Implemented under the ODA loan

Under the ODA loan, related PLN personnel received trainings for operation and maintenance of the project facilities, prior to the completion of the project. The trainings were arranged by the contractors in accordance with the provision of the contracts between PLN and the contractors. Details of the trainings are shown below.

a) Training at Manufacture's Factory

The purpose of the training was to give basic and practically applicable knowledge of equipment to PLN personnel who would be in charge of the project supervision, construction, operation, and maintenance after the completion of the project.

After the explanations of the principles, designs and functions of the equipments, such as; hydraulic turbine, governor, auxiliaries, generator, main transformer, high voltage switchgear, protection system, control system, communication systems, and switchyard equipments, trainings were implemented. Trainings were especially focused on the testing, and inspection procedures of the above-mentioned project facilities.

b) Operation and Maintenance Guidance at the project site

The purpose of the operation and maintenance guidance at the project site was to give knowledge and practical skill of operation and maintenance of the project facilities to PLN staffs that would be assigned for operation and maintenance job after completion of the project. Trainings were especially focused on the actual procedures of operation and maintenance of afore-mentioned equipments.

In addition to the above-mentioned training program, series of 10 formal lectures

[1] Unit Pengatur Beban

were conducted with the objective of smooth execution and implementation of the construction phase of the project. While, these programs were mainly targeted to the PLN personnel who were in charge of supervision of construction, some personnel who responsible for operation and maintenance after completion also received these trainings. The subjects of the formal seminars were as follows:

1. Introduction Phase of the project
2. Site Supervision- Metal Works
3. Site Supervision- Generating Equipment
4. Site Supervision- Civil Works
5. Construction Supervision-Transmission Line
6. Construction Supervision- Architectural Design
7. Construction Supervision- Building Facilities
8. Construction Supervision- Substation
9. Measurement and Monitoring of Dam
10. Contractual Matters

5.2.2 Current Training System to Sustain Technical and Management Capability

It is the responsibility of the chief of Kotapanjang HEPP to monitor the quality and achievement of each staff. There is a periodical monitoring conducted every 4 months by using prescribed format. The result of the monitoring is sent to the Sector for reference. If the technical capacity/ skill level is found inadequate as a result of the periodical monitoring, the staffs are sent to the special training such as i) in-house training in Kotapanjang, ii) practical training in Java, iii) theoretical trainings in Jakarta, and iv) site visits to other parts of Indonesia.

Above-mentioned trainings were also carried out periodically in order to secure the technical and manageable skill level of the staffs. In addition prior to the promotion, the staffs have to take part in the training and to take an examination.

5.2.3 Maintenance Method

Operation and maintenance of the project facilities carried out by the Kotapanjang HEPP with the coordination of PLN Sector Pekanbaru. Maintenance of the project facilities is carried out in accordance with the operation and maintenance manual provided by the contractors. Besides the daily operation and maintenance of the power plant, the duty of Kotapanjang HEPP is to submit periodical reports to the Sector Pekanbaru. The Sector is responsible for reporting the O&M of Kotapanjang to North KITLUR periodically.

Table 5-1: Major Maintenance Activities and its Frequency and Scope

Maintenance Activity	Frequency	Scope of Work
Predictive	Daily	To check vibration of the monitor, temperature of water/oil, pressure on the monitor.
Preventive	Monthly Yearly	Monthly inspection (checking and cleaning) Dismantling (but not all units at the same time)
Breakdown	-	Action to be taken only when the preventive work cannot work.
Overhauling	5 to 6 years	Dismantling and Detailed Inspection with replacement of necessary parts.

Source: Interview at Kotapanjang HEPP

Operation and daily/ weekly/ monthly maintenance of the project facilities are executed by the power station staffs only. On the other hand annual maintenance and overhauling of the project facilities are carried out by the power station staffs with the help of the JTK (Jasa Teknik Kelistriban)[2] and the original suppliers/ contractors.

In order to control stock of spare parts, the power station prepared inventory list of spare parts. Based on the list, they carried out spare parts control and establish procurement schedule. According to the manager of the power station, current stocks of spare parts are enough for two years. Most of these spare parts were supplied by the supplier during the implementation period under the project. However, according to the manager of the power station, there are several problems regarding the supply of spare parts as follows:

1) The equipments accommodated by the ELIN (contractor) are already old fashioned and it is difficult to get the spare parts.
2) Some spare parts have to be indented to manufacture which takes 2 to 3 months.

5.3 Financial Viability of PLN

5.3.1 Financial Conditions of the PLN

PLN's operating revenues originates from electric energy sales, connection fees from customers and from other revenues. PLN's main income source is electricity tariff received from their consumers. Table 5-2 indicates profit and loss statement of PLN. PLN's net income (loss) after tax has been negative since 1997. Moreover, since 1998, operation cost has exceeded operation revenue, and this gap has progressively widened.

Table 5-2: Profit and Loss Statement of PLN (1996-2000) (Unit: million rupiah)

	1996	1997	1998	1999	2000
Operation Revenue					
Electricity Sales	9,418,269	10,877,278	13,766,222	15,670,552	22,139,883
Others	227,724	248,822	269,793	326,566	416,780
Total Operation Revenues	9,645,993	11,126,100	14,036,015	15,997,118	22,556,663
Operation Cost					
Electricity Purchases	77,096	325,162	1,885,963	5,082,703	9,395,365
Fuel & Lubricant Oil	3,361,080	4,338,836	9,408,965	9,691,813	10,375,827
Maintenance	911,267	965,397	924,840	1,497,831	1,610,254
Personnel	886,229	1,068,055	1,018,858	1,335,616	1,802,392
Depreciation	1,886,972	2,250,725	3,074,149	3,224,331	3,229,593
Others	413,726	501,578	495,998	670,384	802,390
Total Operation Cost	7,642,510	9,449,753	16,808,773	21,502,678	27,215,821
Operational Income (Loss)	2,003,483	1,676,347	(2,772,758)	(5,505,561)	(4,659,158)
Non Operating Expense (Net)	(754541)	(2255361)	(6382787)	(5349229)	(19331236)
Net Income (Loss) before Tax	1178415	(579014)	(9155545)	(10854790)	(23990394)
Deferred Tax			(390077)	(514293)	(620975)
Net Income (Loss) after Tax	1178415	(579014)	(9545622)	(11369083)	(24611369)

Source: PLN Annual Report 2000

[2] PLN internal maintenance organization

Table 5-3: Balance Sheet of PLN (1996-2000) (Unit: million rupiah)

	1996	1997	1998	1999	2000
Fixed Assets					
Total Fixed Assets	33,248,288	48,165,604	60,085,451	63,575,641	67,461,767
Accumulated Depreciation	3,409,213	5,636,111	8,690,483	11,756,221	14,820,678
Total Fixed Assets (Net)	27,210,610	29,839,075	42,529,493	51,394,968	52,641,089
Work in Progress	18,209,388	13,996,672	14,291,320	13,481,256	14,227,264
Other Assets	748,080	710,878	1,523,323	1,462,097	2,382,078
Sinking Funds	109,922	253,843	265,725		
Current Assets					
Cash & Bank	1,843,953	1,017,932	4,408,609	3,556,887	4,645,442
Receivable	1,062,709	1,255,832	1,597,750	1,728,766	2,721,180
Inventory	646,040	599,310	770,596	844,021	915,414
Other Current Assets	124,630	144,349	208,059	327,037	462,590
Total Current Assets	3,677,332	3,017,423	6,985,014	6,456,711	8,744,627
Total Assets	52,583,797	60,508,309	74,460,350	73,219,484	77,995,058
Equity	29,231,520	30,271,943	23,395,074	14,506,539	18,625,103
Deferred Revenue	2,458,208	2,847,458	2,972,169	3,076,638	3,234,451
Long Term Liabilities					
Long Term Loan	12,915,143	15,448,857	22,961,269	19,975,608	27,702,490
Obligation	2,598,430	3,198,430	2,518,430	1,600,000	600,000
Customer Deposit	1,231,260	1,447,007	1,567,741	1,761,953	2,022,454
Other Long Term Liabilities	863,704	2,444,686	3,211,953	2,576,491	3,926,804
Total Long Term Liabilities	17,608,536	22,538,980	30,259,393	25,914,052	34,251,748
Current Liabilities	3,285,532	4,849,928	17,833,714	29,722,255	21,883,757
Total Equity & Liabilities	52,583,797	60,508,309	74,460,350	73,219,484	77,995,058

Source: PLN Annual Report 2000

PLN is currently undertaking a major restructuring initiative aimed at the implementation of an optimum industry structure. PLN also adopted an "Early Wins" strategy (a short-term priority strategy). This strategy includes an Operating Cost Reduction Strategy and a Marketing Strategy (see Figure 5-4).

Moreover, in order to recover the company's profitability, PLN increased electricity tariffs in April 2000 in most consumer categories, except for the lower-electricity consuming group. PLN is planning to implement a further increase in the basic electricity tariff, as well as a non-uniform tariff in all territories of Indonesia, depending on economic capability.

Operating Costs Reduction Strategy

- Reducing network loss
- Increasing Asset utilization
- Improving operational and maintenance systems to achieve the lowest level of operational expenses
- Creating new production packages by establishing subsidiary companies and joint ventures in cogeneration
- Implementing a procurement process in a transparent manner, striving for reasonable project prices and quality results
- Shortening the project cycle

Marketing Strategy

- Preparation of manpower and company organization
- Recognition of market behavior through market research
- Product development and differentiation
- Entering the market through promotion
- Increase in service
- Increase of distribution reliability

Source: PLN Annual Report

Figure 5-2: PLN's Early Wins Strategy

5.3.2 Financial Conditions of the PLN Region III and the North KITLUR

PLN's Regions as well as KITLURs prepare their own financial statement, in order to clarify their profitability. KITLUR sells their electricity to PLN Region at prescribed price by PLN headquarters. Actually this internal transfer is only for preparing financial statement of each business unit, thus no actual transaction is made. This average transfer price includes Plant Service Agreement Price (PSA Price) and Transmission Service Agreement Price (TSA Price), former defined by amount of energy and latter defined by peak load. Table 5-5 is profit and loss statement of the Region III. Financial conditions of the PLN Region III in past five years were heavily in the red.

Table 5-4: Profit and Loss Statement of the Region III (Million Rs.)

	1996	1997	1998	1999	2000
Income from Operation	201,382.5	255,076.0	340,512.9	399,864.3	576,148.3
Operation Cost					
- Electricity Purchase		127,121.3	143,318.6	352,163.2	459,587.0
- Electric Cost	9,904.9	7,703.5	6,138.0	5,909.2	8,664.4
- Fuel and Lubricant	137,284.9	63,053.5	84,898.4	109,727.1	124,988.7
- Maintenance	60,362.2	33,464.2	32,366.1	55,024.8	64,480.1
- Personnel Expense	43,134.5	37,597.7	35,558.1	45,736.7	63,913.3
- Administration	15,571.4	11,914.4	11,804.6	14,416.7	18,953.0
- Depreciation	50,678.0	47,811.8	56,716.8	59,638.6	60,640.4
Total Cost	316,935.9	328,666.5	370,800.6	642,616.3	801,226.9
Operating Profit (Loss)	(115,553.3)	(73,590.5)	(30,287.7)	(42,752.0)	(225,078.6)
Net Other Income Expense	(2,480.0)	(3,520.0)	(19,190.7)	(12,010.9)	(38,619.7)
Net Profit (Loss)	(118,033.3)	(77,110.4)	(49,478.4)	(254,762.9)	(263,698.3)

Data Source: PLN Region III

Table 5-5: Average Selling/ Transfer Price

	1998	1999	2000	2001	2002	2003	2004	2005
Average Selling Price* (Rp/kWh)	198.66	206.59	259.42	319.93	400.84	460.97	530.11	609.63
Average Transfer Price** (Rp./kWh)	105.68	267.86	186.22	191.27	319.93	350.38	365.98	386.84

* Selling electricity from the Region III to consumers (from 2002 onwards: estimated figure by the Region III)

** Selling electricity from North KITLUR to the PLN Region (from 2003 onwards: estimated figure by the North KITLUR)

North KITLUR gained net profit in 1999. However, since year 2000, financial balance of the unit has turned into red. However, if transfer price will increased as planned, they will achieve break even after 2003 (see Table 5A-4).

Table 5-6: Profit and Loss Statement of the North KITLUR (Unit: 1000 Rs.)

	1998	1999	2000	2001
Income from Operation	489,171.0	1,280,048.3	951,882.3	1,048,267.4
Operational Cost				
- Electricity Purchase	85.8	40.1	-	-
- Fuel and Lubricant	1,045,485.5	864,362.3	946,169.8	1,234,702.6
- Maintenance	48,435.7	128,203.7	104,523.5	100,200.4
- Personnel	26,524.4	34,045.7	45,488.8	50,040.4
- Administration	10,030.6	8,473.7	12,629.8	19,820.4
- Depreciation	133,673.7	147,023.0	153,510.0	149,914.0
Total Operating Expense	1,264,235.8	1,182,148.5	1,262,321.8	1,554,677.8
Operating Profit (Loss)	(775,064.8)	97,899.8	(310,439.5)	(506,430.4)
Net Other Income Expense	(9,429.6)	(7,817.9)	(39,264.0)	(32,928.4)
Net Profit (Loss)	(784,494.4)	90,081.9	(349,703.5)	(539,358.8)

Data Source: North KITLUR

5.4 Future Prospect of Demand- Supply Balance of the System

5.4.1 Current Condition of the Sumbar- Riau System

The Kotapanjang HEPP connected to 150 kV Sumbar- Riau grid transmission system, which covers West Sumatra Province and Riau Province. At present, the Sumbar- Riau system is supplied electricity from 7 major power stations and a few small diesel power stations with total installed capacity of 674.75 MW (see Table 5-8). According to the PLN UPB Sumbar- Riau, when taking deterioration of generating unit and seasonal deterioration of hydroelectric power station into consideration, the system still has 517 MW of effective capacity*3. On the other hand, peak demand of the system is around 390- 410 MW at present. From the beginning the system had been supplying stable electricity to their consumers. However, recently, the system was forced load shedding*4 due to insufficient electricity supply from the power stations. By the time of field survey*5, load sheddings have implemented from 24th February- 9th March 2002, and 17th- 30th March 2002. In addition, the PLN UPB Sumbar- Riau planned to implement load shedding from 7th- 20th April 2002.

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3 Power producing capacity intended to be available at all times during the period covered by a guaranteed commitment to deliver, even under adverse conditions.

4 Load Shedding: Removal of pre-selected demand from a customer's electric system in the facility to maintain electric load below a certain level.

5 Field survey was implemented from 27th March to 10th April 2002.

Table 5-7: Generating Facility within the Sumbar Riau System

	Name	Rated Capacity	Energy Source	Date of Commissioning
Hydroelectric	Singkarak Hydro	4 x 43.8 MW	Natural Lake	1999
	Kotapanjang Hydro	3 x 38 MW	Artificial Reservoir	1998
	Maninjau Hydro	4 x 17 MW	Natural Lake	1983
	Batan Agam Hydro	3 x 3.5 MW	N.A	1976/ 1981
Thermal	Ombilin Steam Power Plant	2 x 100 MW	Domestic Coal	1996/ 1997
	Pauh Limo Gas Turbine	2 x 16 MW	High Speed Diesel Oil	1982/ 1983/ 1992
	Teluk Lembu Gas Turbine	2 x 16 MW	High Speed Diesel Oil	1996
	Other Diesel Power Stations	27.25 MW	High Speed Diesel Oil	
	Grand Total= 674.75 MW			

Data Source: PLN UPB Sumbar- Riau, PLN Planning Division

The reasons of recent energy shortage can be explained by i) lack of water availability at the reservoir of the Maninjau HEPP and the Singkarak HEPP, ii) inadequate coal supply to the Ombilin TPP.

- Water in the Singkarak reservoir utilizes not only for power generation but also for irrigation, drinking water supply, for industrial consumers etc. And priorities of irrigation and drinking water supply purposes are higher than power generation.
- While the Singkarak and the Kotapanjang have several rivers which inflow into their reservoir, the lake of the Maninjau doesn't have any river inflow, and catchment area of the Maninjau is small.
- PLN had to discharge much water of the Maninjau Reservoir in last December without using generation, because of contamination of water caused by too much use of chum for farmed fishes by surrounding population.

5.4.2 Future Prospect for Demand- Supply Balance of the Sumbar- Riau System

Recent energy shortage was mainly resulted form the shortage of water at hydroelectric power stations. Currently, in order to stabilize energy supply of the gird, PLN keep on negotiating with coal companies for increasing in the coal quota.

At present, because of acute fund constrain, there is no plan for constructing new power station within the grid, but for relocating 20 MW gas turbine generators from Semarang in Java Island to Telku Lembu in middle of 2003.

Table 5-8: Demand Supply Forecast of the Sumbar- Riau System (Unit: MW)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Installed Capacity	674.75	674.75	674.75	694.75	694.75	694.75	694.75	694.75	694.75	694.75	694.75
De-rating Capacity	59.25	59.25	59.25	59.25	59.25	59.25	59.25	59.25	59.25	59.25	59.25
Seasonal De-rating	98.75	98.75	98.75	98.75	98.75	98.75	98.75	98.75	98.75	98.75	98.75
Effective Capacity	516.75	516.75	516.75	536.75	536.75	536.75	536.75	536.75	536.75	536.75	536.75
Load Sumbar	232.30	249.60	278.20	308.80	335.70	367.70	387.10	408.20	431.00	455.60	482.80
Load Riau	92.2	123.67	150.8	174.8	208.9	236.7	257.1	280	303.5	332.3	364.9
Auxiliary Loss	20.40	20.40	22.40	22.40	22.70	26.00	26.00	26.00	26.00	26.00	26.00
Transmission Loss	10.00	10.00	12.30	13.30	14.30	18.1	19.30	20.60	22.00	22.00	25.00
Peak Load	324.50	373.27	429.00	483.60	544.60	604.40	644.20	688.20	734.50	787.90	847.70
Reserve Capacity[6]	192.3	143.5	87.8	53.2	-7.9	-67.7	-107.5	-151.5	-197.8	-251.2	-311.0

Data Source: PLN UPB Sumbar- Riau

[6] Extra generating capacity available to meet unanticipated demands for power or to generate power in the event of loss of generation.

5.4.3 Sumatra Interconnection Project

In order to materialize stable electricity supply throughout the Sumatra Island, PLN is currently carrying out interconnection projects. According to the North KITLUR, the Sumbar- Riau system and the Sumsel- Lampung system as well as small isolated system of Bengkulu and Jambi will be interconnected by the end of 2002, and forming integrated large 150 kV grid system (see Figure 5-10).

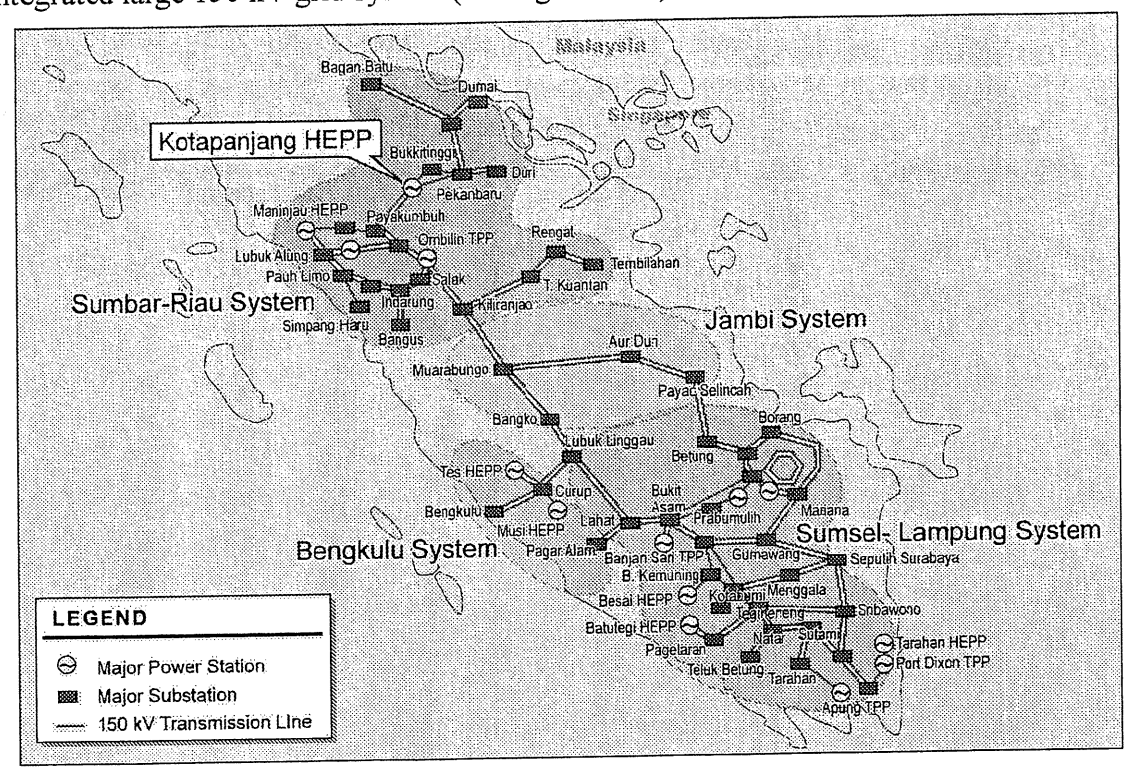


Figure 5-3: Schematic Map of the Integrated Sumatra Grid System in 2006

Table 5-9: Demand- Supply Forecast of the Integrated Sumatra System (Unit: MW)

	2002	2003	2004	2005	2006
Peak Load	430.00	1,167.26	1,262.98	1,366.54	1,478.60
Installed Capacity	694.80	1,631.84	1,631.84	1,871.84	2,041.84
Dependable Capacity	648.00	1,448.20	1,448.20	1,688.20	1,858.20
Largest Unit	100.00	142.75	147.00	170.00	200.00
Effective Capacity	548.00	1,305.45	1,301.20	1,518.20	1,658.20
Reserve Capacity	118.00	138.19	38.22	151.66	179.60
Reserve Capacity (%)	27.44%	11.84%	3.03%	11.10%	12.15%
Energy Production (GWh)	2,260.08	5,623.87	6,085.04	6,584.01	7,123.90

* This forecast is draft version, has not yet approved by PLN headquarter. Source: South Sumatra KITLUR

Table 5-10 is demand- supply forecast of the aforementioned interconnected system (hereafter called the Integrated Sumatra System). The forecast is based on the completion of all planned projects shown in Table 5-11 without delay and cancellation.

Table 5-10: Future Projects within the Integrated Sumatra System

Item	Name of Section	Scheduled Completion
Power Station	1. Batutegi Hydro Power Station (2 x 14 MW)	2002
	2. Inner Thermal Power Station (50 MW)	2002
	3. Excess Power from Pertamina (Total 21 MW) *	2002
	4. Port Dickson Gas-fired Power Station (2 x 65 MW)**	2004, 2005
	5. Tarahan Coal-fired Steam Power Plant (2 x 100 MW)	2005, 2006
	6. Musi Hydro Power Station (3 x 70 MW)	2005-06
	7. Banjar Sari Steam Power Plant (250 MW)	2007
Transmission Line (150 kV)	1. Duri – Bagan Batu	December 2002
	2. Kilirajnao – TL. Kuantan	December 2002
	3. Ombilin – Batusangkar – Payakumbuh	December 2002
	4. Lubuk Linggau – Curup	March 2002
	5. Ombilin – Kiliranjao	August 2002
	6. Kiliranjao – Muarabungo	August 2002
	7. Lubuk Linggau – Bangko	August 2002
	8. Muarabungo – Aur Duri	May 2002
	9. Sutami - Kalianda	April 2002
	10. Talang Kelapa – Betung	December 2002
	11. Kotabumi – Manggala	April 2002
	12. Maninjau – Padang Luar – Payakumbuh (2nd Circuit)	2003
	13. Singkarak – Padang Panjang – Batusangkar	2003
	14. Kiliranjao – Teluk Kuantan	2004
	15. Betung – Payo Selincah/ Aur Duri	2005
	16. T Kuantan – Rengat	2005
	17. Renbat – Tembilahan	2005
	18. Lahat – Muara Enim – Gumawang – Seputih Surabaya	2006
	19. Seputih Surabaya – Sribawono	2006
	20. Borang – Mariana	2006
	21. Mariana – Gumawang	2006
150 kV Substation	1. Batutegi Substation	2002
	2. Kiliranjao Substation	August 2002
	3. Aur Duri Substation	2002
	4. Teluk Kuantan Substation	2002
	5. Rengat Substation	2005
	6. Tembilahan Substation	2005
	7. Muara Enim Substation	2006
	8. Gumawang Substation	2006

Note: Scheduled completion dates of power stations are not necessarily correspond to the table 5-10

* Excess Power from Pertamina's (National Oil Company) captive power plant

** IPP (Independent Power Producer) project

Source: PLN Palembang Project Office

Appendix: "5. Sustainability" Data Sheet

Table 5A- 1: Profit and Loss Statement of the Region III (Million Rupiah)

	1996	1997	1998	1999	2000
Income from Operation					
- Energy Sold	195,603.9	247,079.8	331,897.9	390,546.8	565,978.9
- Other Income	5,778.6	7,996.2	8,615.0	9,317.5	10,169.4
Total Income	201,382.5	255,076.0	340,512.9	399,864.3	576,148.3
Operation Cost					
- Electricity Purchase		127,121.3	143,318.6	352,163.2	459,587.0
- Electric Cost	9,904.9	7,703.5	6,138.0	5,909.2	8,664.4
- Fuel and Lubricant	137,284.9	63,053.5	84,898.4	109,727.1	124,988.7
- Maintenance	60,362.2	33,464.2	32,366.1	55,024.8	64,480.1
- Personnel Expense	43,134.5	37,597.7	35,558.1	45,736.7	63,913.3
- Administration	15,571.4	11,914.4	11,804.6	14,416.7	18,953.0
- Depreciation	50,678.0	47,811.8	56,716.8	59,638.6	60,640.4
Total Cost	316,935.9	328,666.5	370,800.6	642,616.3	801,226.9
Operating Profit (Loss)	(115,553.3)	(73,590.5)	(30,287.7)	(42,752.0)	(225,078.6)
Other Income Expense					
- Income	3,296.0	3,243.6	2,585.7	5,514.6	5,440.7
- Cost	(5,775.9)	(6,763.5)	(21,776.4)	(17,525.5)	44,060.4
Net Other Income Expense	(2,480.0)	(3,520.0)	(19,190.7)	(12,010.9)	(38,619.7)
Net Profit (Loss)	(118,033.3)	(77,110.4)	(49,478.4)	(254,762.9)	(263,698.3)

Data Source: PLN Region III

Table 5A- 2: Estimated Profit and Loss Statement of the Region III (Million Rupiah)

	2000	2001	2002	2003	2004	2005	2006
Income form Operation	567,147	759,007	1,038,129	1,300,658	1,634,699	2,061,510	2,607,426
Operation cost							
- Electric cost	468,251	529,060	532,817	659,399	740,756	836,672	948,698
- Fuel and Lubricant	124,989	194,628	385,115	473,672	593,002	741,924	927,963
- Maintenance	64,480	104,552	131,953	165,673	191,468	220,927	227,715
- Personnel Expense	63,913	69,330	82,558	92,265	103,505	116,171	118,178
- Administration	18,953	30,740	27,701	30,471	33,518	36,870	40,557
- Depreciation	60,803	61,682	70,025	73,484	75,228	76,842	80,250
Total cost	801,389	989,992	1,230,168	1,494,963	1,737,476	2,029,405	2,343,360
Operating Profit (Loss)	225,243	230,985	192,039	194,305	102,777	(32,105)	(264,066)
Other Income (Expense)							
- Other Income	5,237	8,950	3,041	4,456	4,596	4,777	5,275
- Other Cost	(23,221)	(815)	(1,262)	(5,300)	(5,479)	(5,622)	(6,296)
- Subsidies	0	0	0	0	0	0	0
- Gain/Loss on Exchange	(16,034)	(7,781)	0	0	0	0	0
- Interest	(16,251)	(15,569)	(12,387)	(16,348)	(13,007)	(17,165)	(13,657)
Net Other Income Expense	(50,268)	(15,215)	(10,609)	(17,192)	(13,890)	(18,010)	(14,678)
Net Profit before Tax	(275,511)	(246,200)	(202,648)	(211,497)	(116,667)	(14,095)	(249,388)
Tax	0	0	0	0	0	0	0
Net Profit After Tax	(275,511)	(246,200)	(202,648)	(211,497)	(116,667)	(14,095)	(249,388)

Energy Production (GWh)	2,181,704	2,396,148	2,558,000	2,791,090	3,053,630	3,351,310	3,689,710
Average Selling Price (Rp/kWh)	259.42	312	400.84	460.97	530.11	609.63	701.07

Operational Ratio (%)	139.09	130.43	118.50	114.94	106.29	98.44	89.87
Rentabilities (%)	(34.15)	(29.61)	(24.69)	(26.51)	(14.93)	1.77	25.95
Rate of Return (%)	(31.03)	(32.27)	(26.85)	(27.05)	(14.69)	4.73	40.18
Return on Equity (%)	39.67	(36.42)	(32.68)	(35.29)	(20.04)	2.24	27.49
Net Profit Margin (%)	47.82	(32.44)	(19.52)	(16.26)	(7.14)	0.68	9.56

2000: Actual, from 2001 onwards: Forecast by PLN Region III

Data Source: PLN Region III

Note: There is some discrepancy of the figure in 2000 between Table 5A-1 and 5A-2.

Table 5A- 3: Profit and Loss Statement of the KITLUR-North (Unit: 1000 Rupiah)

	1998	1999	2000	2001
Income from Operation				
Electricity Sales	489,171.0	1,280,048.3	842,822.9	903,650.2
Others	-	-	109,059.4	144,617.1
Total Income	489,171.0	1,280,048.3	951,882.3	1,048,267.4
Operational Cost				
- Electricity Purchase	85.8	40.1	-	-
- Fuel and Lubricant	1,045,485.5	864,362.3	946,169.8	1,234,702.6
- Maintenance	48,435.7	128,203.7	104,523.5	100,200.4
- Personnel	26,524.4	34,045.7	45,488.8	50,040.4
- Administration	10,030.6	8,473.7	12,629.8	19,820.4
- Depreciation	133,673.7	147,023.0	153,510.0	149,914.0
Total Operating Expense	1,264,235.8	1,182,148.5	1,262,321.8	1,554,677.8
- Operating Profit (Loss)	(775,064.8)	97,899.8	(310,439.5)	(506,430.4)
- Other Income (Expense)				
- Other Income	705.9	3,503.3	7,116.0	2,772.2
- Other Cost	(51,410.0)	(2,919.8)	(3,632.4)	(4,671.7)
- Interest Charge	(17,167.2)	(20,259.3)	(10,655.4)	(17,579.4)
- Subsidy	-	-	-	-
- Gain Loss on Exchange	58,441.7	11,857.9	(32,092.2)	(13,449.6)
Net Other Income Expense	(9,429.6)	(7,817.9)	(39,264.0)	(32,928.4)
Net Profit (Loss)	(784,494.4)	90,081.9	(349,703.5)	(539,358.8)

	1998	1999	2000	2001
Sales Volume of Electricity (kWh)	4,628,794	4,778,796	5,111,735	5,480,654
Peak Load (kW)	-	-	471,099	624,696
Transmission Loss (%)	2.57	2.65	2.70	-
Average Selling Price (Rp./kWh)	105.68	267.86	186.22	191.27
- Plant Service Charge	105.68	267.86	164.88	164.88
- Transmission Service Charge	-	-	231.50	231.55

Data Source: PLN KITLUR North

Table 5A- 4: Estimated Profit and Loss Statement of the KITLUR-North (1000 Rupiah)

	2001	2002	2003	2004	2005
Income from Operation					
- Electricity Sales	923,478	1,714,724	2,031,306	2,284,789	2,612,458
- Others	150,644	181,905	219,600	264,456	320,299
Total Income	1,074,122	1,896,629	2,250,906	2,549,245	2,932,757
Operational Cost	1,448,329	1,855,823	2,210,104	2,508,467	4,130,113
- Electricity Purchase	0	313,279	471,058	646,593	841,615
- Fuel and Lubricant	787,843	811,838	909,009	1,097,615	2,476,268
- Maintenance	123,222	179,512	267,086	194,631	235,687
- Personnel Expense	52,849	55,491	58,256	61,179	64,238
- Administration	15,954	17,549	19,304	21,235	23,358
- Depreciation	468,462	478,153	485,392	487,216	488,947
Total Expense					
Operating Profit (Loss)	(374,207)	40,805	40,792	40,778	40,763
Other Income/ Expense					
- Other Income	2,026	2,077	2,129	2,182	2,237
- Other Cost	(1,492)	(1,529)	(1,568)	(1,607)	(1,647)
- Subsidies	-	-	-	-	-
- Interest Cost	(41,353)	(41,353)	(41,353)	(41,353)	(41,353)
- Loss on Exchange	-	-	-	-	
Net Other Income Expense	(40,818)	(40,805)	(40,792)	(40,778)	(40,763)
Net Profit (Loss)	(415,025)	0	0	0	0

	2001	2002	2003	2004	2005
Sales Volume of Electricity	5,600,911	5,928,178	6,424,107	6,965,477	7,581,372
Peak Load (kW)	650,730	714,333	783,965	858,271	945,004
Transmission Loss (%)	2.70	2.70	2.70	2.70	2.70
Average Selling Price (Rp./kWh)	191.78	319.93	350.38	365.98	386.84
- Plant Service Charge	154.88	289.25	316.20	328.02	344.59
- Transmission Service Charge	231.50	254.65	280.12	308.13	338.94

2001: Actual, from 2002 onwards: Forecast by KITLUR- North

Data Source: PLN KITLUR- North

Note: There is some discrepancy of the figure in 2001 between Table 5A-3 and 5A-4.

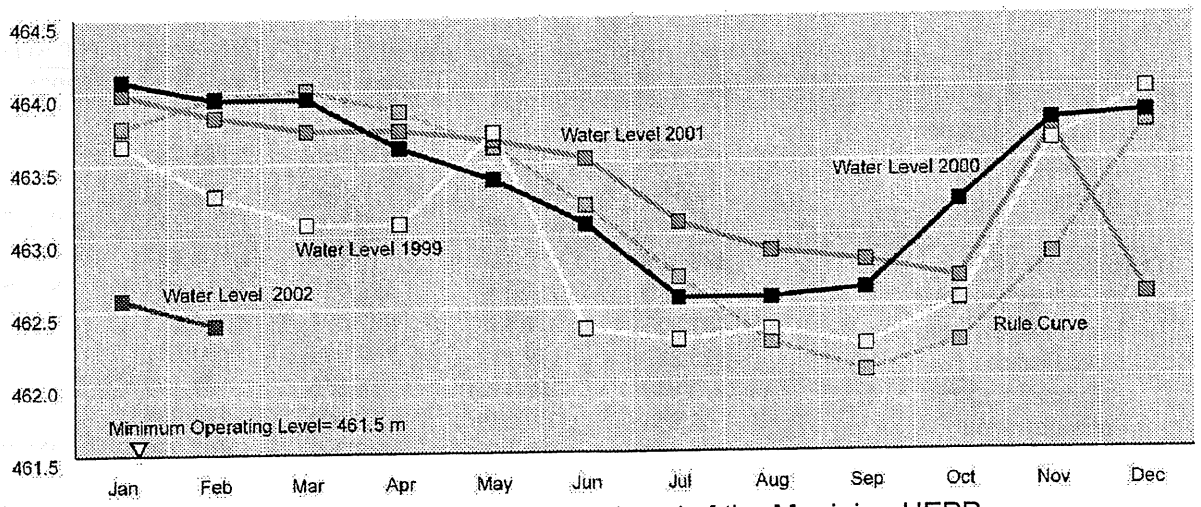


Figure 5A- 1: Reservoir Water Level of the Maninjau HEPP

Table 5A- 5: Reservoir Water Level of the Maninjau HEPP (Unit: m)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Yr. 1999	464.07	463.94	463.94	463.60	463.38	463.07	462.56	462.56	462.62	463.22	463.77	463.82
Yr. 2000	463.63	463.28	463.08	463.08	463.70	462.35	462.27	462.34	462.23	462.54	463.63	463.98
Yr. 2001	463.98	463.82	463.72	463.72	463.65	463.52	463.08	462.88	462.81	462.69	463.71	462.57
Yr. 2002	462.57	462.39										
Rule Curve	463.75	463.95	464.00	463.85	463.60	463.20	462.70	462.25	462.05	462.25	462.85	463.75

Data Source: PLN Sector Bukittinggi

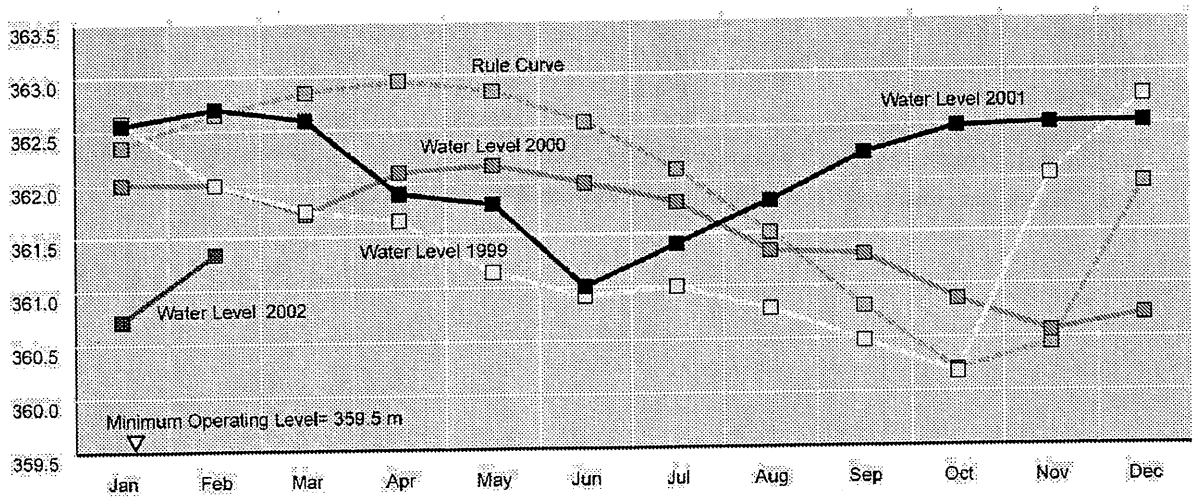


Figure 5A-2: Reservoir Water Level of the Singkarak HEPP

Table 5A- 6: Reservoir Water Level of the Singkarak HEPP (Unit: m)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Yr. 1998	363.00	363.00	363.00	362.32	362.20	362.20	362.00	362.62	362.55	362.55	362.48	362.58
Yr. 1999	362.55	362.70	362.59	361.89	361.01	361.01	361.40	361.80	362.24	362.48	362.51	362.52
Yr. 2000	362.58	361.99	361.74	361.64	361.15	360.92	361.00	360.79	360.48	360.18	362.03	362.77
Yr. 2001	362.00	361.99	361.71	362.09	362.15	361.98	361.79	361.33	361.29	360.86	360.56	360.72
Yr. 2002	362.72	361.34										
Rule Curve	362.35	362.65	362.85	362.95	362.85	362.55	362.10	36.00	360.80	360.20	360.45	361.95

Data Source: PLN Sector Bukittinggi

Table 5A-7: Actual Daily Load Curve of the Sumbar- Riau System on 28th Feb 2002 (Unit: MW)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Ombinin	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Pauh Limo	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	15	15	15	15	10	10
Teluk Lembu	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	15	15	15	15	10	10
Kotapanjang	37	37	37	37	41	41	36	36	36	36	36	36	36	36	36	36	36	95	99	97	99	92	88	45
Singkarak	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	85	85	85	56	56	0
Maninjau	13	13	13	13	9	9	4	4	4	6	6	6	2	2	2	2	2	16	30	26	29	26	18	8
Batan Agam	4	4	4	6	8	10	8	5	5	5	5	5	5	5	5	5	5	5	8	8	8	5	5	5
Load Shedding	89	57	81	65	75	100	93	71	61	61	60	60	52	49	51	58	57	0	0	0	0	0	0	84
System	283	251	275	261	273	300	281	256	246	248	247	247	235	232	234	241	240	286	372	366	371	329	307	282

Data Source: PLN UPB Sumbar- Riau

Table 5A-8: Ideal Daily Load Curve of the Sumbar- Riau System on 28th Feb 2002 (Unit: MW)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Ombinin	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171	171
Pauh Limo	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	15	15	15	15	10	10
Teluk Lembu	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	15	15	15	15	10	10
Kotapanjang	66	42	62	47	52	65	64	42	36	36	33	33	22	21	25	20	20	52	104	103	105	75	63	53
Singkarak	14	8	11	10	16	24	12	12	8	8	8	8	8	6	8	8	15	29	36	34	35	30	30	19
Maninjau	8	6	7	7	6	10	6	6	6	8	10	10	9	9	9	9	9	10	24	21	23	18	18	14
Batan Agam	4	4	4	6	8	10	8	5	5	5	5	5	5	5	5	5	5	5	8	8	8	5	5	5
System	283	251	275	261	273	300	281	256	246	248	247	247	235	232	238	233	240	287	373	367	372	329	307	282

Data Source: PLN UPB Sumbar- Riau

Table 5A-9: Daily Load Curve (In case of Sufficient Coal Supply for the Ombilin TPP) (Unit: MW)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Ombinin	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Pauh Limo	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	15	15	15	15	10	10
Teluk Lembu	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	15	15	15	15	10	10
Kotapanjang	78	52	76	60	70	85	78	56	46	48	47	47	35	32	34	41	40	95	88	88	90	81	84	89
Singkarak	36	30	30	30	30	40	30	30	30	30	30	30	30	30	30	30	30	90	90	90	60	60	30	
Maninjau	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	16	36	30	33	33	18	18
Batan Agam	4	4	4	6	8	10	8	5	5	5	5	5	5	5	5	5	5	5	8	8	8	5	5	5
System	283	251	275	261	273	300	281	256	246	248	247	247	235	232	234	241	240	286	372	366	371	329	307	282

Data Source: PLN UPB Sumbar- Riau

Appendix 2

Detailed Result of Impact Survey

Appendix 2.1

PRA Meeting Record

1.0 PULAU GADANG PRA MEETING

Name of Village	:	PULAU GADANG
Date	:	12 March 2002
Time	:	02.30 – 05.30 p.m.
Chaired by	:	DRS. YOSERIZAl, MS
Team members	:	
• University of Riau (UNRI)	:	1. Desriwan, SH 2. Ir. GME Manurung, MSi 3. Achmad Rivai, ST, MP 4. Ir. Lumen Mundi
• PT. Bita Bina Semesta (BBS)	:	1. Dr. Lucia Nugroho, MSc 2. Ir. Baban Suhendar 3. Ir. Agust Siswanto
Attendees	:	67 Participants (see Attendee List in Attachment)

1.1 General Issues

The meeting began at 02:00 p.m. until 05:30 p.m. and was attended by 67 participants comprised of village officials, village elders (Ninik Mamak), community leaders, Holders of the Tradition, religious leaders, Muslim clerics, village intellectuals, Community, women and youths. The meeting was opened by the team from the University of Riau who stated that the purpose and objective of the meeting was to discern the community's opinions with respect to the impacts of the Kotapanjang HEPP project on the socio-economic and socio-cultural fabric of the community. Before continuing with the meeting, the head of village address a few words to the community, where he requested the audience to state their opinions in a truthful but courteous manner.

The community remarked that to date various parties claiming to be from NGOs as well as other organizations have contacted them to query and collect information on the state of the Village. However, to date their lives have undergone no real changes. Therefore, the community hopes that the visit by the teams from the University of Riau and the Consultant will provide some real benefits, notably on the economic situation of the village that has been greatly impacted by the existence of the Kotapanjang HEPP project.

A. PAF's general impression on current conditions

The Pulau Gadang Village community's general view with respect to having been relocated because of the Kotapanjang HEPP development is that when they first moved to the new

village conditions at the new site were very deplorable, without any means of livelihood to support them. However, due to their own courage and initiative, actual conditions have now changed notably because of freshwater fishing ventures, as the plantations and housing that the government hitherto promised them proved to be unsatisfactory. When they first moved to the new location they found that the plantations had not yet been planted and no clean water supplies were available at the housing settlement. Contrary to the promises made by the government prior to their relocation, MCK was unavailable, whereas the kitchen and bathroom were located far from the house. Hitherto, they were promised semi-permanent houses, but in reality the houses did not match design. In the old village, the community lived in proper semi-permanent housing. Livelihoods at the old village comprised of rice field cultivation, tapping for rubber, collecting wood in the forests, picking coconuts and growing rice in fields around the old village was sufficient to sustain the community.

In general, the community stated that since their relocation due to the Kotapanjang HEPP Dam, all previous sources of livelihood has subsequently disappeared. Currently, the main source of income for the people of Pulau Gadang is freshwater fish farming notably *patin fish*. Economic conditions at the new site are very different from the old village, although income is still insufficient when compared to the old village. Amelioration of road, bridge, plantation, clean water, and MCK were undertaken at the self-initiative of the community, as facilities provided by the Government were unsuitable. The fields provided by the government near the settlement were a complete failure and not ready for harvest. However, the inhabitants were able to cultivate on their own with some assistance from the government.

Other problems that the community at Pulau Gadang to date still experiences is the housing issue. The government provided houses did not fulfill community expectations, living expenses (or jaminan hidup/jadup) were only provided for a year, house roofing in general leaked and the houses wooden planks decayed and neighborhood roads dirt covered. Given such conditions, the community requests that the roads be paved to facilitate marketing of fish products, rubber as well as other agriculture products.

B. Impact of the changes planned before the inundation, which in the end turned out to be unfavorable for the community

The direct and indirect impacts of the Kotapanjang HEPP Dam pledged to the community before the area's inundation has had a detrimental effect in community livelihoods. This is attributed to the topography of the new site, which is quite different from the old village. Moreover, many actual conditions are quite different from that which the government originally promised, including semi-permanent housing, ready for tapping rubber plantations, clean water supply, Village road,. MCK, which in turn has disaffected the community when compared to conditions at the old village.

C. Examples of some positive and negative impacts arising from the Kotapanjang HEPP Dam development

1. Positive Impact

The presence of the Kotapanjang Dam as the supporting material for electrical turbine generators, with a carried capacity of 114 MW has had a positive impact on supply of electricity, notably for the Pulau Gadang inhabitants, who originally inhabited the upstream reach of the dam. Prior to being relocated the people used oil lamps, in particular for night lighting for their children when reviewing their religious and school lessons. Even though goods at the old village is now under water, the community can still strive to fulfill daily needs with existing sources of income.

Various accesses to the Sumatra highway are nearer when compared to the old village.

2. Negative impact.

- Currently the community has no rice fields. The state of the agriculture fields and plantations is not the same as in the old village. Currently the community has no permanent source of livelihood to sustain them. The water source, which is located far from the settlement also places restrictions on daily activities. Prior to moving to the new site, the community used the Kampar River as a source of water for daily needs, in particular for MCK, and drinking. The state of the housing is also quite different from that hitherto promised by the government before the inundation.
- Family ties within the same group have also become detached, as the new site is not located in one location and also outlying.
- Increasingly higher costs of living as the amount of fields provided are limited.
- "Tanah Adat" or traditional land in the form of community land ("Tanah Ulayat") is no longer available, hence farming and plantation lands for future generations are no longer available.
- Absence of land available for new households.
- Shift in culture and tradition, which to date is dominantly needed for making decisions on descendents/nephews.
- Change in the quantity and quality of the fields when compared with the old village.

1.2 More Specific Issues

A. Land Compensation

1. PAF Opinion Against Land Compensation Issues

An issue that to date has not been resolved and is still a thorn to the people affected by the inundation of the Kotapanjang HEPP Dam is unsettled compensation as well as unsatisfactory compensation. It was revealed that as many as 14 plots that are now submerged have to date not received compensation. The community also demands that the amount of the compensation, which has already been paid-out be reexamined as the amount is far below their own appraisal. For example, ex-agriculture fields were valued at Rp. 30/sq. meter, court yards at Rp. 70/sq. meter. Even then, the people considered this to be cheaper than a clove cigarette (Ji sam soe). Ditto for coconut trees, which were valued at Rp. 7800/tree, whereas a coconut fruit alone at that time cost Rp. 500 a piece.

2. Community efforts to submit compensation claims

The community has carried out without success various efforts to obtain compensation. They feel tired, weary and have no desire left for compromising with the party that constructed the dam. In order to settle compensation issues, many have spent large sums with only uncertainties as their reward.

The community suggests that with respect to the compensation issue after an accord is made, the responsible party should pay the price that was agreed on and payment should be given to the associated person.

B. Clean Water Supply

1. Government Pledges with Respect to Clean Water Supply

Prior to moving to the new settlement, the community obtained water from the Kampar River. However, the government hitherto pledged to provide ready to use clean water facilities and supply. In reality, after moving to the new settlement the community did not find any of the promised facilities. Hence, in spite of many restrictions, the community repaired the governmentally constructed wells. However, the results were unsatisfactory, thus the community uses river water for their water needs, notably for drinking purposes. The river is 1-m wide and 0.5 m deep. Although wells were provided when they first moved to the new site, the wells were dry and the government instead filled the wells with water from a tank.

2. Efforts to Ameliorate Clean Water Facilities

Efforts undertaken to date with respect to clean water facilities include trying to repair the existing wells. Meanwhile, the government has constructed clean water facilities after the community moved to the new settlement, but the design was inadequate and the water ran for only a year. While still taking into account community efforts, there are those who use river water for drinking, bathing, washing and toilet.

3. Suggestions and Recommendations Given By The Community With Respect to Provision of Clean Water

The community's recommendations and suggestions should be rapidly realized in order to fulfill clean water needs as the number of people inhabiting this new village has since increased, this being:

- Construction of a drill well so that the water could be distributed to each house.
- Reparation of existing wells so that they contain water that can be used.
- Construction of a reservoir to store water flowing from the hills, thereafter the water could be distributed to people's homes.

C. MCK Facility

1. Government Pledges with Respect to Provision of MCK

The community reported that the new site had no washing and bathing facilities. Latrines at the new site were unsuitable and unusable, consisting of a squat latrine over a 1-m deep pit. The community could not use the latrines as the refuse could not be flushed away but instead back-flowed because the pit was too shallow and covered by a single layer of corrugated iron. In the end, the community abandoned using the latrines. With respect to bathing facilities, conditions in the new village are quite different from the old village, notably bathrooms that are quite unsatisfactory. In the end, all MCK facilities have been abandoned.

The government did not carry out any efforts to improve conditions. Hence, to date 90% of the population of Pulau Gadang Village uses the River for bathing, washing and toilet purposes. Those who have the means have constructed a WC above the fish ponds.

2. Community Suggestions and Recommendations With Respect to MCK

The community stated that if the necessary funds are available, good suitable WCs should be constructed, so that in turn the community need no longer go to the river.

D. Electricity Supply

1. Government Pledges with Respect to Provision of Electricity

The electricity that the government pledged prior to the community's relocation was kept 2 weeks after the Pulau Gadang community moved to the new settlement. PLN electricity was available in all houses, the community only had to pay the bills on electric consumption. However, the community desires to have street lighting. The government pledged to provide 5 MW electricity, free installation and connection, which were all fulfilled.

E. Provision of Housing

1. Government Pledges with Respect to Provision of Housing

Prior to relocation, the government hitherto pledged to provide the community with semi permanent houses, comprised of half cement and half wood. However, when the community moved to the new location, the quality of the houses was a far cry from the promises. The floors were shabby and only 3 cm thick, with some wood stumps still protruding. The quality of the wooden planks was quite ordinary with stumps also still protruding.

To date, although the community really hopes for some assistance none are forthcoming for renovation or reparation.

As such, given the community's grievances brought upon by the Kotapanjang HEPP relocation, the community requests that the remaining houses that are unsuitable for living be renovated and those who have carried out self-renovation with their own means should be repaid for the money they spent .

2. Efforts Undertaken by the Government with Respect to House Renovation

- To date the government has undertaken no efforts to renovate the houses.

3. Recommendations and Suggestions Proposed By the Community With Respect To Housing

- Owners who have renovated their houses at their own cost should be reimbursed for the money they spent.
- The government should construct houses that conform to the promises they made prior to the community's relocation to the new site.

F. Palm Oil/ Rubber Plantation

1. Government Pledges With Respect to Provision of Plantations

Prior to moving to the new settlement, the government pledged to provide 3-year old trees ready for harvesting. However, upon moving to the new village the villagers did not find any plantations. Moreover, aid to develop a plantation was given only in 1999 after the community demonstrated before the Governor in Pekanbaru. The community had difficulties in providing for their families, however the PAF of Pulau Gadang did not want to give up. They were willing to accept any type of work, such as hiring themselves elsewhere as hard laborers and construction workers. Ten years after moving to the new settlement the government finally fulfilled their promises to develop a plantation, however the plantation has not yet begun to produce. Accordingly, 4-5% of the old plantations is still producing, whereas the previously promised plantation can not yet be used as a means of livelihood.

2. Efforts by the Government to Ameliorate the Plantations

The government only started implementing measures to ameliorate the situation at the end of 1999, by providing seedlings and fertilizer as well as wages.

3. Suggestions and Recommendations by the Community With Respect to Rubber Plantation

The community recommends that the promised plantation be improved by the government, as well as being provided with additional assistance for development, maintenance, and continuity until the plantations begin to produce. The community also recommends that the access road to the plantation be repaired as it is very difficult for the community to reach the plantations, particularly during the rainy season.

G. Income

1. Source of Income at The New Village

In the old village, the community of Pulau Gadang tilled the land, grew rice, farmed, caught fish in the Kampar River, and collected wood from the forest. However, currently in the new village the old means of livelihoods have disappeared as the new site is designated for a specific plant, whereas rice cultivation is not possible given the sparse water supply and absence of irrigation. At the new location, those that have the means have started to cultivate *patin fish*, whereas those who do not have the means have hired themselves out elsewhere as well as catch fish in the Kotapanjang Lake. Even though means are limited as well as shifts in livelihoods instigated by the relocation, the community still continues to send their children to school when the latter reaches school age.

Cost of living in the new location is high, notably transportation cost. Accordingly, the plantations promised by the government should be optimized as well as provide training and education on economic ventures in particular people based economy, and reparation of infrastructure such as roads, market, housing, health facilities etc.

2. Efforts by the PAF to Ameliorate and Increase Income

Efforts undertaken by the community include looking for jobs elsewhere, whereas those that have capital have begun to cultivate *patin fish*, as well as planting their court yards with orange trees.

3. Recommendations and Suggestions by PAF with Respect to Livelihood
The community recommends that they be provided with assistance for :
- Improving their plantations, such as fertilizer and maintenance of other plants.
- Provide assistance or construct floating fish cages as realization of hitherto promises.

H. Opinion of the PAFs Against NGO

1. NGO That Has Visited
The community of Pulau Gadang stated that with respect to advocate agencies or other relief organizations, in particular NGO, to date none have provided any assistance. The community hopes that if the University of Riau could with the community's participation design better living prospects, they would feel more confident and optimist.

2. Community Who Knows NGO
The community acknowledges that there are NGOs, however the latter received no response from the Village Head, and said NGO only came to meet the ninik mamak (village elders) and not the community.

3. Presence of NGO in the Settlement
The NGO's visit was done solely to the Ninik Mamk and only once. The NGO was Taratak from Bukit Tinggi.

1.3 Other Field Findings

1. The Pulau Gadang Community queried on the results of the PRA meeting.
2. The findings obtained from the meeting should be realized as soon as possible as the community is tired and weary from being visited by so many agencies without any results.
3. All facilities and supporting infrastructure at the new settlement should be reexamined by the University that have known for some time now the substance of the problems.
4. Compensation that has not been paid should be settled with the real amount.
5. Public water supply and for each family provision of MCK, house renovation and plantation.
6. Provision of street lighting and renovation of road leading to the plantation.

PRIORITY OF PROBLEMS SOLVING IN PULAU GADANG VILLAGE

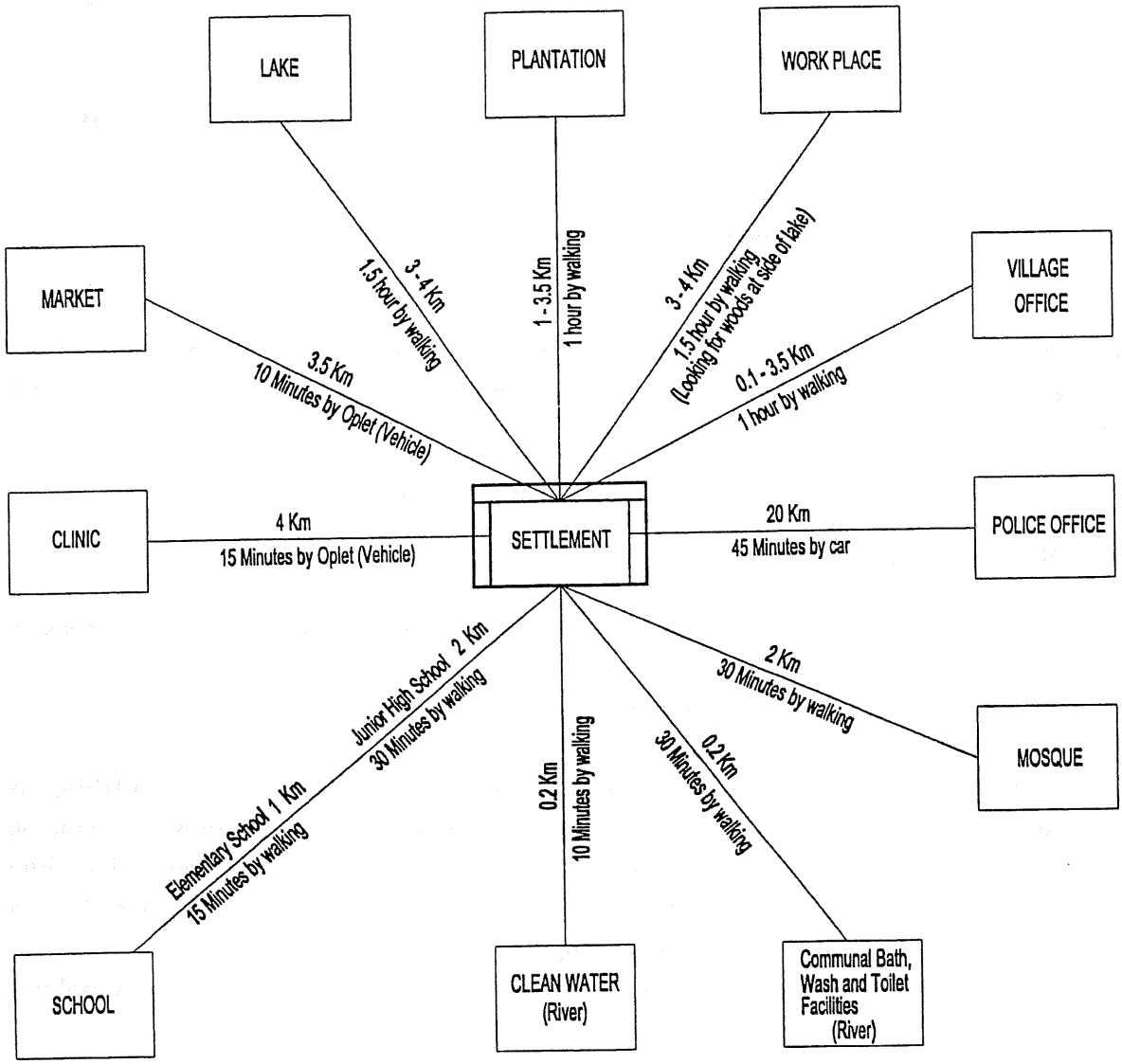
NO	TYPE OF PROBLEM	Priority 1	Priority 2	Priority 3
1	Land Compensation	**42**	1	3
2	Rubber/Palm Oil Plantation	29	32	11
3	Clean Water Supply	4	**34**	15
4	Electricity	0	9	2
5	House Condition	2	2	2
6	MCK	0	2	4
7	Road Condition	3	10	5
8	Livelihood	17	10	**48**
9	Household Evolution	2	0	0
10	Village Boundary	2	0	0
11	Jadup (Live Guarantee)	4	4	0

The PAFs were also queried on the distance and time needed to reach frequently visited places such as rubber plantation, market, school (Elementary, Secondary), places of worship, health clinics, village office etc (See *Figure 1*).

1.4 Resume of PRA meeting

1. Shift in traditional land designation, as well as shifts in the socio-economic and socio-cultural features of the community.
2. The social structure that to date was associated to grouped farming activities has now shifted to individual types of activities
3. PAFs think that there are some positive impacts of the dam such as availability of electricity and various accesses to the Sumatra highway are nearer compared to the old village. The negative impacts are no permanent source of livelihood, family ties within the same group became detached, higher cost of living, lost of traditional land or "Tanah Adat", shift in culture and tradition.
4. Conflicts on unsettled compensation issues are in turn being used as a political commodity against human rights by certain other groups.
5. Shift in livelihood patterns as a result of economic difficulties at the new settlement.
6. Shift in the land topography between the old and new village.
7. According to PAFs, land compensation, water supply and livelihood are problems needed to be resolved as soon as possible.

Figure 1
Distance to Important Facilities Diagram in Pulau Gadang Village



2.0 KOTO MESJID VILLAGE PRA MEETING

Name of Village	:	KOTO MESJID
Date	:	March 10, 2002
Time	:	02.00 p.m.
Chaired by	:	DRS. YOSERIZAL, MS
Team members	:	
• University of Riau (UNRI)	:	1. Ahmad Rifai, SP, MP 2. G ME. Manurung, SP, MP 3. Ir. Sakti Hutabarat, Magr.Econ 4. Ir. Lumen Mundi 5. Desirwan, SH
• PT. Bita Bina Semesta (BBS)	:	1. Dr. Lucia Nugroho, MSc 2. Ir. Baban Suhendar 3. Ir. Agust Siswanto
Attendees	:	40 Participants (List of attendees is attached)

2.1 General Issues

The meeting with Koto Mesjid Village community began at approx. 02:00 p.m. and was attended by 40 persons including village officials, village elders ("ninik mamak"), community leaders, and community scholars. Women who were expected to attend did not show up. The JBIC party from Japan also attended the meeting.

In general, the Koto Mesjid Village is better off when compared to the other villages affected by the inundation of the Kotapanjang HEPP Development. The major occupation of the villagers is "patin" fish cultivation. According to the village head and the cultivation group, the harvest is 2 – 3 tonnes per day. However, not everybody has taken up this business. Some of the PAFs grow oranges and the result is favorable.

With respect to the day's meeting, the people hope that it would produce some positive results that would improve the lives of the people. The people hope that social and public facility in their village, including provision of lighting and paving for the village roads would be realized in the near future.

A. PAF's general impression on current conditions

The community feels that their current situation is very different from conditions prior to being resettled. The area's condition, is suitable for plantation, rice cultivation, and fish cultivation as well as has adequate water supply, hence opportunities to improve the economic level is better than in the old village. Previously the PAFs did not cultivate "patin" fish, which currently has a very prospective market. On the other hand, the PAFs complained about the housing facilities, which did not correspond to the promises made by the government.

B. Impact of the changes planned before the inundation, which in the end turned out to be unfavorable to the community.

In general the plans and promises made by the government before the inundation were very admirable and would improve the people's circumstances. However, in reality most of the pledges were not kept. The current patin fish cultivation was not suggested by the government but the initiatives of the community in utilizing lowland areas around their neighborhood. The fish farming has now become the main source of income. Accordingly, the community hopes that the government will improve the irrigation facility of their village.

C. Examples of some positive and negative impacts arising from the Kotapanjang Dam development.

1. Positive Impact
   - Children educational level improved with the availability of Elementary School, Junior High and Senior High School in the new village
   - Availability of electricity for the community.
   - The new village is closer to the main road, making transportation easier.
   - The new source of income, this being "patin" fish cultivation, provides significant contribution to the household economy.
   - Access to Pasir Pangarayan and Pekanbaru is nearer.

2. Negative impact
   - The villagers who do not cultivate patin fish feel that their income is inadequate, because their rubber plantation is not yet ready to harvest, whereas other forms of livelihood is not available. Previously they possessed rice fields that could guarantee food supply during the year.
   - Erosion in customs and traditions, such as the annual buffalo slaughter ritual that was conducted in the old village during special occasions, but has never been performed in the new area. The community worries that such rituals, which beforehand were deeply respected and observed, will cease.

2.2 More Specific Issues

A. Land Compensation

In general the land compensation is completed and many of the PAFs claim to be satisfied. Several PAFs claim that part of their land have not received compensation (the total that has not yet been compensated is approx. 390 parcels), this being remote forestland in the previous village. Hence, some PAFs consider that the lands are unsuitable for compensation, but should it be given they will accept it.
The community has not received compensations for graveyards and graveyard resettlement cost (Rp. 75.000 / graveyard), as well as "Sialang" trees (bee hanging location).

1. Community efforts to submit land compensation claims to the government.
   No efforts have been taken to claim compensation, but the community has narrated the land compensation issue to parties coming to the village such as consultants, NGOs or university parties.

2. PAFs suggestions in order to solve the land compensation issue
   With respect to the land compensation issue the PAFs recommend that land has not been compensated be done so. The amount should be transparent and paid straight to the community without any middlemen.

B. Clean Water Supply

1. In principle, the government provided a clean water supply at the new village, this being water pumped with diesel power to distribute water to PAFs houses. However, as the storage tank was located far from the houses not all villagers could utilize the facility. After two years the machine cease operations because the government stopped the funding, whereas the community could not afford to pay the operational cost. The PAFs overcame the problem by self-digging wells at each house. To date, almost all houses possess their own dug well, except for houses in the highland (RT I) which to date has no clean water.

2. Other efforts performed by the community to secure clean water supply is by flowing clean water from the mountain through a 2.5 km long 3 inch pipe from the hill.

3. Some suggestions and recommendations given by the community with respect to provision of clean water is by improving the water pipe and adding storage tanks in order for all villagers to be able to have clean water.

C. MCK Facilities (Public Bath Wash and Latrine)

The government pledged to provide each house with MCK, whereas in reality bath and wash facilities were not provided. Latrines were available but unsatisfactory, hence most of them were not utilized.

1. The government made efforts to improve the non-functioning MCK facilities through PPK (*Program Pembangunan Kecamatan* or District Development Program), by providing two public MCK at the places of worship.

2. According to the community, to date approximately 95% of the community do not possess latrines in their houses. Most villagers excrete in the fish ponds.
   Therefore, the community recommends that each house be provided with a latrine.

D. Provision of electricity

1. Upon being relocated until 3 years afterwards the community utilizes diesel generated electricity resource provided by the government. Electricity installation in each house was provided free of charge, including installation of electricity gauge. The community only pays for consumption. In general, the community is satisfied with the provision of electricity.

   Nevertheless, the community recommends that all houses are provided with electricity and streetlights are installed.

E. Provision of Housing

1. With respect to the provision of housing the government as the project owner hitherto promised to construct semi permanent houses, with walls from cement in the lower part and wood in the upper part and appropriate for living. However after the PAFs living in the vicinity of the dam were relocated, they found that the new housing were wooden houses with cement plastered flooring and inappropriate for habitation. Tree stumps were also found inside and outside of the houses. Furthermore, the electricity wires leaked.

   With respect to their housing, the community proposed several recommendations, this being :
   a. That houses unsuitable for habitation should be renovated.
   b. Since moving to the new village the number of the original PAFs at Koto Mesjid has increased by 360 households, hence the community requests a housing development loan from BTN, this being the RSS housing loan.

F. Rubber plantation

1. Hitherto, the government pledged that when the community moved to the new location they would find rubber trees ready for harvesting. However, in reality the community found that the promised rubber plantation were not planted or didn't have any rubber trees, much less trees ready for harvesting. In addition, the location of the rubber plantation, which was realized in 1999, is far from their village and access to the plantation is difficult due to the inappropriate road conditions.

2. Recommendations proposed by the community in order to overcome problems associated to the rubber plantations include being treated equally like other villages, who have received free rubber assistance, as well as reimbursement of money that has been spent. Lands located on the watershed should be relocated to the mainland. If possible, they should be provided with living allowance ("jadup") until the rubbers are ready to harvest.

3 With respect to the rubber plantations the PAFs recommend product diversification in order to obtain other sources of income.

G. Income

Prior to moving to the new location, the livelihood of the Koto Mesjid Village community included various activities or sources such as farming, fish catching, wood and rock collecting. In the new village, the main sources of living are patin fish cultivation and plantation laborers. When fish prices are high, income is a lot better compared to previous incomes.

According to the community, living cost in the new village is rather high, such as transportation cost and daily needs, which has to be purchased from outside of their village.

The people's suggestion for increasing their income is by optimizing the usage of their 0,4 ha land area, which requires capital for maximum utilization.
The community also recommends that they obtain the same treatment like the other relocated villages, i.e. road provision/repair, allocation for plantation maintenance, provision of daily allowance, provision of donation, etc.

H. NGO

Several NGOs have assisted the community, among others the LSM Patriot & LSM BMT Pekanbaru. However, the community feels that they have not obtained any benefits from the presence of the NGOs. The community trusts that the University will help them.

2.3 Other findings

1. The Community hopes that the meeting will produce a follow-up action.
2. During the meeting somebody introduced himself as coming from Taratak Kampar NGO, exhibiting his photograph in Japan advocating for the fate of the Tigabelas Koto Kampar community that is victims of the Kotapanjang HEPP inundation.
3. The meeting indicated that 3 issues should be settled in priority, this being:
   a. Compensation of unpaid plots
   b. Clean water provision for households and fishponds.
   c. Maintenance fee and living allowance until the rubber plantation is ready for harvest.

PRIORITY OF PROBLEMS SOLVING IN KOTO MASJID VILLAGE

NO	TYPE OF PROBLEM	Priority 1	Priority 2	Priority 3
1	Land Compensation	2	1	0
2	Rubber/Palm Oil Plantation	5	**12**	5
3	Clean Water Supply	2	4	0
4	Electricity	0	0	1
5	House Condition	0	2	4
6	MCK	0	0	1
7	Road Condition	4	5	**9**
8	Livelihood	**17**	3	4
9	Household Evolution	0	0	0
10	Village Boundary	0	0	0
11	Jadup (Live Guarantee)	0	0	0

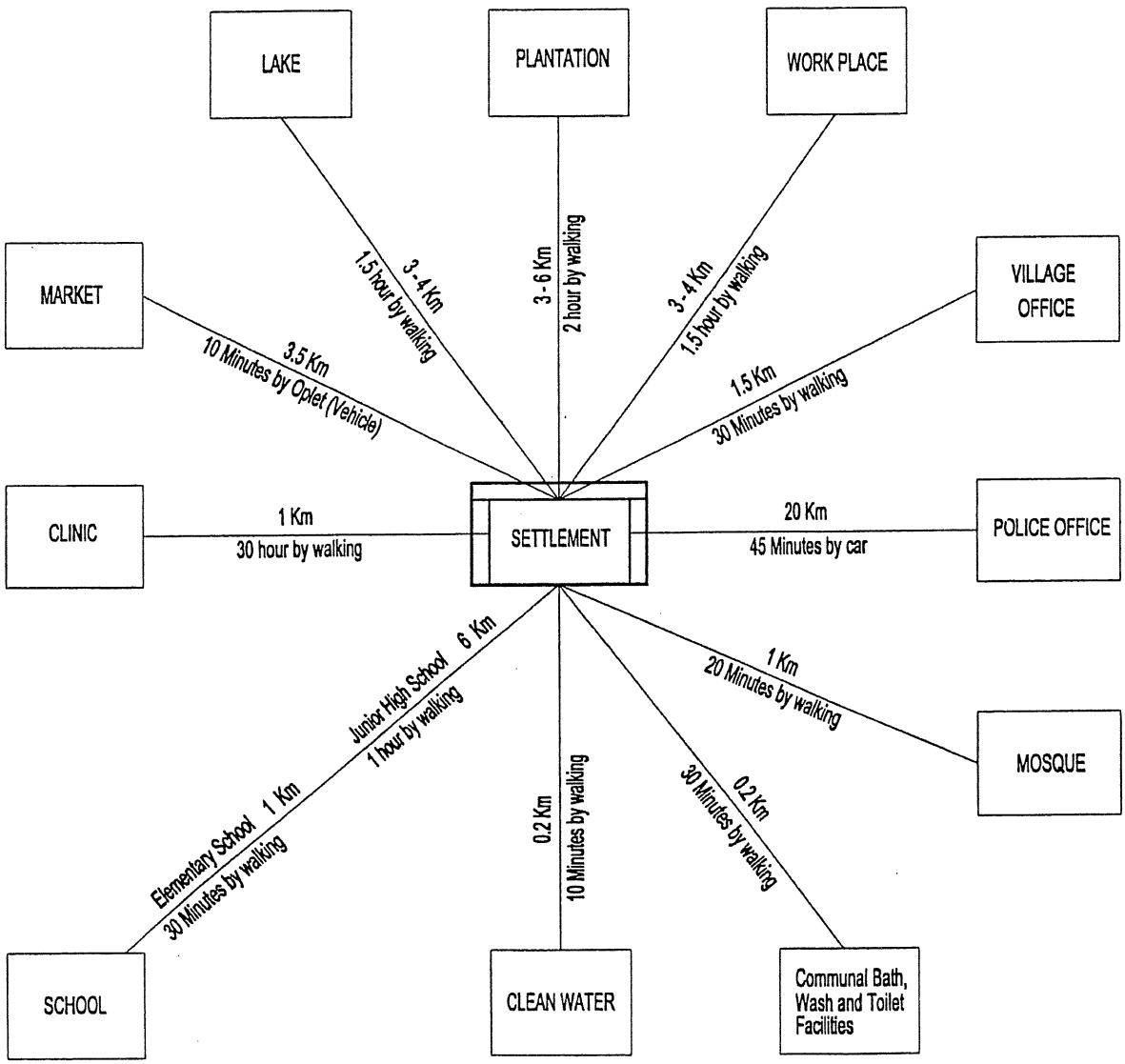
The PAFs were also queried on the distance and time needed to reach frequently visited places such as rubber plantation, market, school (Elementary, Secondary), places of worship, health clinics, village office etc (See *Figure 2*).

2.4 Resume of PRA meeting

1. Unlike in other villages, PAFs said that the opportunities to improve the economic condition in the new village are better than in the old village.
2. According to PAFs, there are some positive impacts of the dam to them, such as better educational facilities, availability of electricity, closer to the main road network and the availability of new source of income. The main negative impacts are the rice field can not fully supply their rice requirement and they are facing custom and traditional erosions.
3. There are only a minor problem of land compensation in this village
4. Water supply and MCK provided by government were not satisfactory. To date, almost all houses have built their own water well and most of them do not have any latrine.

5. PAFs got free electricity connection from the government. Different from other villages, PAFs in this village are satisfied with the provision of electricity.
6. According to PAFs, government promises on provision of housing and rubber plantation were not as promised by the government.
7. PAF's priority on problems to be solved are livelihood, rubber plantation and road condition.

Figure 2
Distance to Important Facilities Diagram in Koto Mesjid Village



3.0 RANAH SUNGKAI VILLAGE PRA MEETING

Name of Village	:	RANAH SUNGKAI
Date	:	March 11, 2002
Time	:	03.00 p.m.
Chaired by	:	DRS. YOSERIZAL, MS
Team members		
• University of Riau (UNRI)	:	1. Ahmad Rifai, SP, MP 2. G ME. Manurung, SP, MP
• PT. Bita Bina Semesta BBS	:	1. Ir. Agust Sistwanto 2. Ir. Baban Suhendar
Attendees	:	198 Participants (List of attendees is attached)

3.1 General Issues

The meeting began at approx. 03:00 p.m. and was attended by about 198 participants including village officials, village elders (ninik mamak), community leaders, the community (men and women) as well as youths, and children who have to face the impact of the Kotapanjang HEPP project.

A. PAF's general impression on current conditions

The community feels that their current situation is very different from their condition prior to being resettled, particularly with the area condition, where the plantation, rice cultivation, fish cultivation and water supply are adequate for economic increase compared to their live in the previous village. Prior to being resettled, the community found it difficult to improve their economy, due to constraint of land and topographic condition, and no electricity power from PLN, accordingly the community is difficult to provide lighting for their children to study during nighttime.

Other impacts for the community after the resettlement is resolving that the physical condition of housing is inadequate with the previously promised by the government, and inadequate sanitation.

B. Impact of the changes planned before the inundation, which in the end is unfavorable to the community.

In general the plans and promises made by the government before the inundation were very admirable and would improve the people's circumstances. However, in reality most of the pledges were not kept. This has made the people's lives lamentable, notably concerning their

main occupation which does not exist anymore. The rubber plantations promised to be ready for harvest were not available when they moved to the new villages, it only planted in 1999. In addition, the people have difficulties in obtaining water and there was no electricity to lighten the village roads.

C. Examples of some positive and negative impacts arising from the Kotapanjang Dam development.

1. Positive Impact

Some of the positive impacts to the community generated from the Kotapanjang HEPP project include:

- Connection road to Tandun Rohul area which formerly did not exist.
- The availability of electricity in every house, although the village roads are still dark.
- Incoming limited development projects, such as : argoforestry projects, etc.

2. Negative impact

Examples of negative impacts arising from the Kotapanjang HEPP include:

- H. Rusli narrated, beforehand there were paddy fields in our area that could be harvested twice a year. Even during time of scarcity we could still survive. However at present we have nothing to rely on, so we have to purchase rice all year round.
- H. Rusli's narration was agreed by the others, that their present situation is worse than before. Formerly, by planting rubber they could send their children up to university, however at present they could not afford to send their children to the high school in Bangkinang

3.2 More Specific Issues

A. Land Compensation

1. The Government through the Head of Kampar Regency earlier promised to compensate all lands belonging to the community, which were stated prior to resettlement. However the promise was not as expected and not all lands have been compensated.
The Several opinions were given with respect to the land compensation that the community hitherto received, this being :

a The community requests that the compensation that they hitherto received be reexamined as they feel that the sum established by the government was too low and that they were compelled to accept it, such as :

- House garden was compensated Rp. 700 / m2, garden Rp. 30 / m2, rubber tree Rp. 2.500 / tree.
- Durian trees which used to harvest all year and sometimes could be sold, were appraised Rp. 6.000 per tree. To date durian is sold at Rp. 3.000 per fruit, it is big lost for the community.

b Several inhabitants queried on their land of which has not been compensated.

c The community queried on the land compensation table established by the Japanese government or OECF, whether it is equivalent to the one resolved by the Indonesian Government cq Kampar regional government.

2. Community efforts to submit land compensation claims to the government.

To date the community queries government's effort in improving or settling the land compensation polemic. PAFs have tried to claim/ call upon the Kampar Regency Government, but still no result.

3. PAFs suggestions in order to solve the land compensation issue

The meeting resulted that approximately 75 % of the attendance agreed to recommend reexamination of land compensation prices, while 20 % suggested on disregarding the land compensation and demand the government to promise in improving their economy.

B. Clean Water Supply

The government pledged to provide clean water in form of wells in each house. However, in reality the wells were available but too shallow. Most of the villagers could not use the well, and they obtain water by digging deeper well and store rain water.

1. Governmental efforts to improve clean water provision

The community feels that the governmental efforts to improve clean water provision are very insufficient. Hence, the community attempted by gaining water from rivers and several others dug wells with their own money.

2. Community's suggestions and recommendations

The community suggested on constructing drill or pump wells or at least 1 drill or pump well for every 2 houses.

C. MCK Facilities (Public Bath Wash and Latrine)

1. The government pledged to provide each house with MCK, whereas in reality bath and wash facilities were not provided. Latrine was available but un-satisfactorily and

almost all were dis-functional. To date approximately 50% of the PAFs do not possess latrine and so the community utilizes the river or digs holes or store in plastic bags and then throws them away.

3. Governmental efforts
The people of Ranah Sungkai Village to date feel that the government has made no efforts or endeavors to improve or repair the non-functioning MCK facilities, and some actions must be taken.

4. Community's suggestions and recommendations
The community expects this matter to be taken seriously and aid provided.

D. Provision of electricity

1. The government's pledge and actualization

Electricity is one of the highlighted matter, due to the government's explicit promise (although orally) to the community that when they moved to the new house they would find electricity in each house and free cost of installation as well as free electricity consumption. However, in reality no electricity was provided during resettlement. The community had to wait for two years and they were charged Rp. 150.000 per house for installation and charged for monthly consumption. It could be concluded that the community is treated equal to other communities (i.e. city) to obtain electricity where they should register, pay, and wait in line. At the moment only approximately 50 % PAF's have electricity in their houses.

2. Governmental efforts to improve electricity problems
The community feels that to date the government's effort to improve electricity problems in their village is very insufficient.

3. Suggestions and recommendations proposed by the community
The community are asking for royalty from PLN in obtaining electricity service, i.e. : deduction of electricity consumption cost and lighting installation along the village roads.

E. Provision of Housing

1. Governmental pledges and actualization
The government hitherto promised to construct semi permanent houses, with walls from cement in the lower part and wood in the upper part and appropriate for living. However in reality :

a. The houses were made from wooden planks (temporary), which the community considers as exigency housing.

b. The roofing was made from asbestos, which was strongly rejected. Most of PAF's want corrugated iron for their roofs
c. The cement plaster flooring was in very poor condition, mixed with dirt.

2. Governmental effort to improve the condition

To date, the community feels that the government has made no efforts or endeavored to improve the condition of the houses to conform to their previous promises, although they have complained since being resettled.

3. Recommendations and suggestions proposed by the community

The community suggested that the government should keep their promise to provide decent housing and adequate compensation for those who have renovated their house. They suggested renovation cost for each house is allocated between 5 – 10 million rupiah for each house

F. Rubber/palm oil plantation

1. Governmental pledges and actualization
Hitherto the government pledged that when the community moved to the new location they would be provided with 2 ha area of rubber plantation per PAFs and rubber trees ready for harvesting. However, in reality the community found the promised rubber plantation were not planted or didn't have any rubber trees. Reality rubber trees ready for harvesting are not available. The rubber trees were planted 5 years afterward.

The rubber plantation is considered a significant issue, being the community's main income prior to relocation. The existing rubber trees are 1 – 2 years old and still require 2 more years to be able to be tapped. Several villagers, which their garden were not inundated, go back to their former village in order to fulfill living requirement. Most villagers were compelled to do anything to survive. The rubber plantation is 2 – 4 km away from the village with deficient access, particularly during rainy days. Accordingly the community demand the government to repair the roads.

2. Efforts undertaken by the government
Efforts undertaken by the government to ameliorate the rubber plantation include providing fertilizer, garden maintenance and living allowance for a year.

3. Recommendations and suggestions proposed by the community
The community suggested to be provided living allowance until the rubber trees are ready for harvest, and provided with required facilities until rubber trees are ready to be harvest.

G. Income

1. Prior to moving to the new location, the livelihood of the Ranah Sungkai Village community was from rubber plantation. In the new village their livelihood changed due to different situations. Several villagers catch fish from the dam. The number of fish increased due to expansion of water area. To date the number of fish decreased due to over fishing caused by overbalanced fishermen. Other alternatives are gambir trees which they planted during resettlement but in limited amount. Several FAP's tried to get other work as plantation worker, porter, outside their villages etc.

2. Efforts undertaken by the community to increase their income include working in other people's garden in other areas, i.e. : Tandun and Pasir Pangayan

3. The community proposed on provision of daily allowance (jadup) and garden maintenance fund until the rubber trees are ready for harvest.

H. NGO

1. NGOs involvement
   To date the community feels that no NGO or other parties have tried to help them improve their lives. However in general the response is positive, for the community heard the generosity of NGOs in fighting the community's aspiration. A few villagers responded negative, given that the NGO gave unrealistic promises in which rose conflicts in the community. Notwithstanding, the community appreciates UNRI's visitation to support and provide advice.

2. NGO activities
   To date the communities are unaware of NGO activities in their village.

3. The meeting attendees stated that any NGO or other organization has never contacted them, although they have witnessed the activities in other villages.

3.3 Other findings

1. Several community leaders inquired on concrete follow up from the findings of this meeting, for improvement of themselves and the village.
2. The community appealed UNRI to strive for their needs and they are willing to assist.
3. Based on the questionnaire result, there are 3 issues that should be settled in priority, this being:
   a. Land compensation, which should be revised in accordance to the ample standard.
   b. Alternative livelihood to increase their living.
   c. Village boundary.

PRIORITY OF PROBLEMS SOLVING IN RANAH SUNGKAI VILLAGE

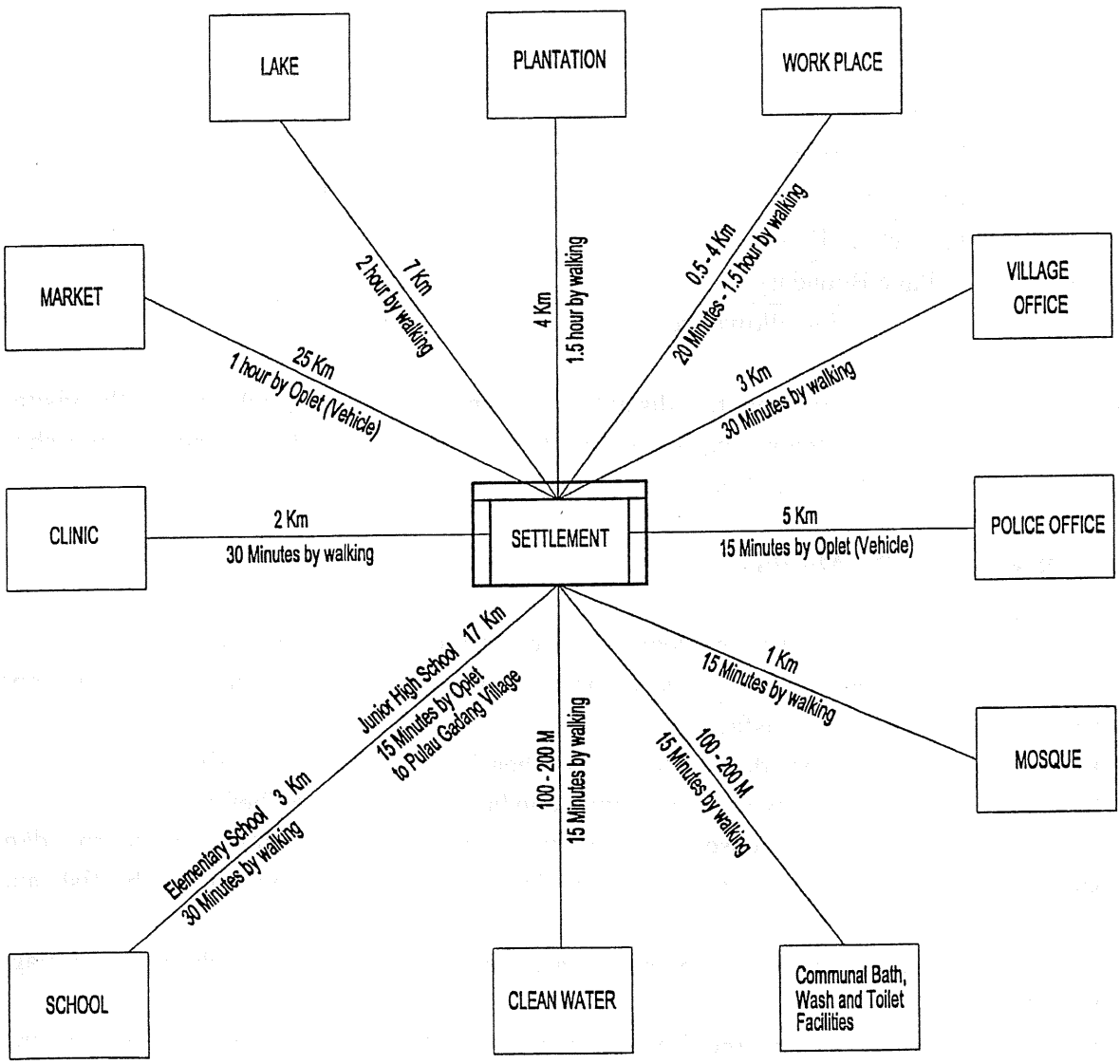
NO	TYPE OF PROBLEM	Priority 1	Priority 2	Priority 3
1	Land Compensation	**96**	7	1
2	Rubber/Palm Oil Plantation	3	5	0
3	Clean Water Supply	3	1	4
4	Electricity	0	2	0
5	House Condition	70	31	26
6	MCK	1	3	10
7	Road Condition	1	7	8
8	Livelihood	22	**105**	25
9	Household Evolution			
10	Village Boundary	4	30	**115**
11	Jadup (Living allowance)	0	0	0

The PAFs were also queried on the distance and time needed to reach frequently visited places such as rubber plantation, market, school (Elementary, Secondary), places of worship, health clinics, village office etc (See *Figure 3*).

3.4 Resume of PRA Meeting

1. The PAFs are upset with the resettlement process that distressed their life.
2. The government's promises on land compensation, water supply, electricity supply and house provision were unsatisfactorily
3. Rubber trees of which they depend to support their living were not available.
4. Most PAFs feel that their existing economic condition is worse than before.
5. Whether the government posses good political will, then the access road to the dam should be accessible. Hence, the PAFs should be trained to cultivate keramba fish and provide the markets.
6. PAF's priorities on problems to be solved are land compensation, livelihood and village boundary.
7. Several community leaders inquired on concrete follow up from the findings of this meeting for improvement of themselves and their village.

Figure 3
Distance to Important Facilities Diagram in Ranah Sungkai Village



4.0 LUBUK AGUNG VILLAGE PRA MEETING

Name of Village	:	LUBUK AGUNG
Date	:	15 March 2002
Time	:	09.00 – 11.15 a.m.
Place	:	Musholla (Lubuk Agung Prayer House)
Chaired by	:	DRS. YOSERIZAL, MS
Team Members	:	
• University of Riau (UNRI)	:	1. Desriwan. SH 2. GME. Manurung, SP, MSi
• PT. Bita Bina Semesta (BBS)	:	1. Dr. Lucia Nugroho, MSc., DEA 2. Ir. Agust Siswanto
Attendees	:	90 participants (list of attendees is attached)

4.1 General Issues

The meeting began from 09.00 until 11.15 a.m. and was attended by 90 people comprised of Village Head, Village Officials, Muslim clerics and scholars, Village elders (ninik mamak), intellectuals, youths and women. The meeting was opened by the team from UNRI who explained that the purpose of the meeting was to discern the people's opinion with respect to the socio-economic and socio-cultural impacts of the Kotapanjang HEPP project. Before beginning with the meeting's agenda, the community queried why the University of Riau had never beforehand visited them. Since the community's relocation to the new village, UNRI had never paid them much attention, meanwhile the community had experienced a lot of suffering because of the Kotapanjang HEPP development. The Team responded that in fact the University had come before to provide assistance either through student field work or community service programs. In the end, the community expressed gratitude to the team for their visit. The Head of the Village then opened the meeting and addressed a few words of welcome, while at the same time requested the audience to remain courteous.

A. PAF's general impressions on current conditions

Originally, the PAFs was enticed to relocate to the current site after conducting a comparative study to West Java to observe firsthand the community that was relocated because of the Saguling HEPP. development. Their findings indicated that the community at Saguling was free to move, all goods were compensated, however the quality of the community's life did not improve and some in fact did not even own goods anymore. With respect to the relocation associated to the Kotapanjang HEPP development, it was originally understood that the PAFs' goods would be recompensed and houses as well as rubber plantations would be provided as well as utilities such as electricity. Hence, the PAFs chose to relocate.

In general, issues that emerged within the Lubuk Agung PAFs as a result of the Kotapanjang HEPP development are as follows:

1. Passage to an undulating and steep land topography, whereas their previous village was located on relatively flat land. Therefore, it is difficult to till and farm the current land. The PAFs stated that their lives are now very deplorable if compared with life in the old village, where the land could be used to grow crops and rice.

2. Given the undulating topography of the current area, many of the PAFs were compelled to move to their community land ("tanah ulayat"), which is located in a relatively flat area. Hence, the houses that were located on hills were dismantled and removed to the "tanah ulayat", which provides better protection against natural disasters and is safer as well as has water for agriculture.

3. Some of the PAFs believe that the compensation that the Government paid for the land and plants was only 10% from the budget scheme set by the Japanese and does not conform to the amount agreed upon. Hence, the price is inappropriate and disappointing to the PAFs.

4. Clean water supply for drinking, bathing, washing and toilets is far below expectations and promises. When the PAFs arrived at the new village they found 1 well for every 3-4 houses, however the wells bottoms' were lined with cement. Hence, after a week the wells dried up.

5. The conditions of the housing was below standards, therefore the PAFs were compelled to do some renovation. The Government hitherto pledged to provide semi-permanent structures, such like that in the old village. However, what the PAFs found in fact was wooden plank houses with 3-cm thick cement flooring. Renovation of the below standard housing was done with the compensation money, which should have been used as capital for new ventures.

6. The government pledged that the PAFs would be provided with rubber plantations that in 3 years time would be ready for harvesting. However, to date this is still unrealized.

7. Compensation, land topography, water quality, housing quality at the new village were all below expectations and governmental pledges.

8. If compared with life at the old village, the situation of the Lubuk Agung PAFs at the new village is very distressing, as the source of livelihood (rubber plantation) that the government promised was not fulfilled. Therefore, in order to survive the PAFs are forced to work as hire laborers or deal in trading in other villages or even outside the District.

B. Impact of the changes planned before the inundation, which in the end turned out to be unfavorable for the community.

The Government pledged that the relocation would improve the welfare of the Lubuk Agung community, notably with respect to income as well as supporting facilities. However, in reality when the PAFs moved to the new location none of the governmental promises to the PAFs were fulfilled.

Various matters that to date remain unacceptable to the PAFs include land compensation, state of housing, rubber plantation, water facilities and MCK facilities. When they first moved to the new location, it was extremely difficult to find their houses as the land was covered with bushes and the state of the house was a far cry from that promised beforehand. Instead of finding semi-permanent houses, the PAFs found wooden plank houses with flooring made from ±3-cm thick rough cement.

As the state of affairs were below the expected pledges, the PAFs to date feel very disappointed and malcontent, notably with respect to land and plant compensation.

C. Examples of Positive Impacts Arising from The Kotapanjang HEPP Dam Development

1. Positive impact that the Lubuk Agung PAFs to date stills benefit after moving to the new location is the road. At the old village the community had to use small boats to leave the village. Nowadays, they can use vehicles.
2. Availability of electric current until the houses.

D. Examples of the Negative Impacts Induced by the Kotapanjang HEPP Dam Development.

The negative impacts of the new location against the PAFs include:

1. The amount of the compensation received for the land and plants was too low or inappropriate.

2. Change in the agricultural pattern, as the soil is infertile and located on undulating land if compared with the old village, which was located on a relatively flat area.

3. Difficulties in securing steady livelihoods and fixed income, as the ready to harvest rubber plantations that the government hitherto promised turned out to be just lies. Hence, the PAFs finds themselves living under economic hardships.

4. Houses that were unsuitable for habitation, unavailability of the MCK that the government promised and difficulty in obtaining clean water supply.

5. Change in family ties, because they are now scattered everywhere. This in turn has lead to changes in the social pattern, notably relationships between villages and relatives in the old village.

4.2 More Specific Issues

A. Land Compensation

1. Land Compensation that the PAFs Received

Various issues related to the compensation that the PAFs received are:

The PAFs acknowledge that they received compensation for their old land. However, there are those who believe that the sum paid out represents only 10 % of the Table set up by the Japanese. Accordingly, the PAFs consider that the amount of the compensation is inappropriate and that the Government has deceived them.

Some examples of the sums that the community received include:

- Rice fields = Rp. 500/m2
- Gardens = Rp 30 / m2
- Courtyards = Rp. 500 /m2

According to the PAFs 3 plots have not been compensated, as well as graveyards. Given that the PAFs believe that they have been paid only 10 % of the established amount (Japanese scheme), they accordingly demand that the remaining amount be directly paid to them without the intervention of the government or middlemen. According to past experiences, many of the compensation were determined in the private homes of BPN (Badan Pertanahan Negara or National Land Agency) personnel with the help of middlemen.

2. Efforts undertaken by the PAFs to overcome the compensation issue

To date, the PAFs have undertaken no efforts to resolve the compensation issue, as the Lubuk Agung PAFs represent part of the old Batu Bersurat Village. Accordingly, in order to settle the compensation issue the PAFs must enlist at the old Village, which is rather difficult. Through the medium of this day's meeting the PAFs stated that the compensation must be paid 100% in accordance to the agreed contract (table from the Japanese). The PAFs to date, have never gone through the legal system to settle the compensation issue and obtain their real rights.

3. PAFs Suggestions and Recommendations with respect to land compensation
Various recommendations and suggestions from the PAFs to overcome the compensation issue include :

- The compensation amount that has and not yet been paid should conform to the sum agreed between the PAFs and the Government. Accordingly, all the land that has received compensation should be repaid with the real sum.
- If repayment is carried out, the PAFs demand that it be carried out without the intervention of middlemen.

B. Clean Water Supply

1. PAFs opinion with respect to the clean water supply promised by the government

Prior to moving the new village the PAFs source of clean water for drinking and MCK came from the Batang Kampar River. The government pledged that at the new location the PAFs would be provided with clean water facilities that would be distributed to each home. However, the water facilities did not conform to the design hitherto promised, hence it could not be used. Accordingly, the PAFs are compelled to use water from a small river or swamps located between 100 –200 m from their houses for domestic purposes.

2. Efforts undertaken by the Government to Rehabilitate and Improve Clean Water Facilities

Upon moving to the new location the PAFs found that every 3 houses were provided with a 3- 4 m deep rainwater fed well. Hence, the PAFs could not use the facilities and collected water from the nearest river. After 4 years at the new location, the Government constructed a small Dam. However, this undertaking did not succeed and could not be used. Currently, the Government is building new water facilities that conform to the requirements and land topography of the new location. The new facilities have not been inaugurated, hence the PAFs still use river water for drinking, bathing, washing and toilets.

3. PAFs suggestions with respect to Clean Water Supply

The PAFs recommend that the new clean water facilities reach individual house and that a communal tank be constructed for the community along the road.

C. MCK Facilities

1. Governmental Pledges with respect to MCK Facility

The PAFs admitted that the Government never made any official pledges with respect to MCK facilities. However, the PAFs consider that such facilities would normally be part of the housing facilities provided by the government.

MCK facilities provided by the government for each house consisted of pit latrines located ± 10 meter from the house. The structure was 1 x 1 m covered by planks/corrugated iron with corrugated iron roofs. As there was no water flow, the latrines were very smelly and the PAFs considered them sanitarily unsavory and unsuitable for use. In the end, the PAFs disposed their bowel movements in rivers or in holes dug in the ground or in plastic bags, which were later on thrown in bushes located near the houses (flying WCs is the termed used by the PAFs). Such conditions affect health, particularly infants. The new location has even experienced an gastro-intestinal related epidemic.

2. Efforts to Rehabilitate MCK

To date, the government has undertaken no efforts to rehabilitate the MCKs, hence the PAFs still use the river. PAFs who can afford to do so have build their own MCK or rehabilitated the existing MCK. However, most of the PAFs are unable to do so as they used the compensation money to renovate their houses.

3. PAFs recommendations with respect to MCK

The Lubuk Agung PAFs demand that the Government built sanitary appropriate MCK by providing each household with a suitable MCK.

D. Supply of Electricity

1. Governmental pledges with respect to electricity
The government hitherto pledged that the PAFs would inhabit houses connected freely to electricity. However, in reality such was not the case. The PAFs feel very disappointed as the government promised to provide all the necessary electricity facilities, which turned out to be just lies.

Given that there is no electricity, the PAFs use kerosene lamps, whereas the old village already had electricity generated from a genset.

Electricity was finally supplied 4 years after the PAFs moved to the new village, even so the PAFs were required to pay for installation and connection. Cost of connection and installation of 3 points were between Rp. 450.000 - Rp. 1.300.000 for 900 watts, although the waiting list is very long.

Currently the village's electricity network has all the necessary lines, however for connection to the individual houses not all PAFs can afford to do so as livelihoods at the new village is very difficult.

2. Efforts undertaken by the government to provide electricity

It was only in 1997 or 4 years after the PAFs arrival at the new village that the village obtained electricity. However, the PAFs had to pay and wait a long time to get individual electricity house connections..

3. PAFs recommendations with respect to the supply of electricity

The PAFs recommend that the village be equipped with street lighting as the PAFs stated that street lighting is included in their monthly electric bills.

E. Housing

1. Governmental promises with respect to housing.

Hitherto, the Government pledged that the PAFs would receive semi-permanent houses in the new village. However, in reality the structures of the houses were very disappointing, as they consisted of wooden planks with 3-cm thick cement flooring. Hence, the PAFs feel that they have been deceived. Furthermore, they feel maltreated as the settlement is located far from any source of water, has no MCK, far from the main road and located on top of a hill.

Given that the location did not conform to the original promises some of the PAFs abandon and some dismantled their houses and moved to a location nearer to the village throughway.

2. Efforts undertaken by the Government to Improve Housing Quality

To date, the government has made no efforts to improve the quality of the housing. On the contrary, the PAFs either abandoned the government provided houses or dismantled them and removed to a more suitable location that is nearer to the water source, village road and electrical network.

3. PAF's suggestions with respect to housing

The PAFs recommend that the Government move houses built on mounds to more appropriate locations, this being near water and transportation facilities. In addition, they request that newly married couples be provided with their own houses.

F. Rubber and Palm Oil Plantation

1. Governmental Pledges with Respect to Provision of Plantation

Originally, the government pledged that at the new village the PAFs would receive 2 hectares of rubber plantation that is ready for harvesting. However, the promises turned out to be but empty lies , the new location didn't even have any plantations.

2. Efforts undertaken by the Government to Rehabilitate the Plantations

After various efforts undertaken by the PAFs since moving to the new village (1995) to obtain the promised rubber plantations, in 1998 the government finally provided assistance to each household, this being 2 hectares of land, as well as seedling, fertilizer, chemicals and maintenance cost totaling Rp. 1.060.000/ha. Included in the latter figure is cost for felling, preparations for planting, planting, spreading fertilizer and eliminating pests. Currently, the trees are 3 years old.

3. PAFs Recommendations With Respect to Rubber Plantations

The PAFs request that they be given money equivalent to the harvest of 2 ha of rubber for the period that they had no rubber plantation, this being from 1995 – 1998 or 3 years. In addition, they demand that they be provided with living allowance or "jadup" until their current 3 year old rubber trees start to produce.

G. Income

1. PAFs impression on source of income at the new location

Given that the rubber plantation as the main source of income pledged by the government was not realized, after moving to the new location the PAFs earned their livelihood as rubber laborers at other villages or as woodcutters. Currently, life for the PAFs is very difficult as the governmental promises were never kept. Hence, the PAFs have no fixed income, which in turn affects the education of their children as many have dropped out of school.

If compared to their lives at the old village, life has become more difficult as in the old days the PAFs earned their livelihood from tapping rubber, catching fish, growing rice and farming. In the present location, as the topography is undulating it is difficult to do farming and far from the lake (for fishing).

2. PAF's efforts to increase income

Efforts undertaken by the PAFs to increase income includes working in the fields of neighboring villages, seeking works elsewhere, as well as catching fish in the Kotapanjang Lake although the latter is located far from the village and the catch is not enough to support a family.

3. PAFs recommendations with respect to increasing

Suggestions and recommendations by the PAFs of Lubuk Agung for increasing income include:

- Rehabilitation of the road leading to the Lake in order to increase opportunities for the people to catch fish at the Lake
- Providing technical and financial assistance for fish farming with floating cages.
- Settlement and housing layout at the village should be improved to facilitate economic activities.
- Extension of the "Jadup" or living allowance until the rubber trees starts to produce.

H. NGO

To date the PAFs of Lubuk Agung have never been visited by an NGO. The visit from the UNRI and Consultant teams represent the first time the community had the opportunity to express their sufferings to an agency.

4.3 Other Findings

Several specific findings associated to Lubuk Agung village is:

- The PAFs at Lubuk Agung expressed their hope that the meeting would find a solution to their difficulties
- Many of the original houses have been dismantled and moved to locations nearer to the road and water facilities.
- During the meeting the PAFs queried why is it only now that UNRI is moved enough to assist the PAFs of Lubuk Agung on finding a solution to the economic hardships that has been placed on them because of the Kotapanjang HEPP development.

The meeting indicated the 3 issues that should be resolved in priority, this being:

1. Compensation should be remunerated with actual or appropriate amounts and given directly to those concerned without the intervention of middlemen or the Government.
2. Employment and business opportunities to improve income.
3. Newly married couples should be provided with houses.

The complete results of the priority ranking exercise is as follows:

No.	Issues	Priority 1	Priority 2	Priority 3
1	Land Compensation	**112**	4	6
2	Rubber/Palm Oil Plantation	0	9	2
3	Clean Water Supply	0	0	1
4	Electricity	0	1	0
5	House Condition	0	3	3
6	MCK	0	0	0
7	Road Condition	0	0	0

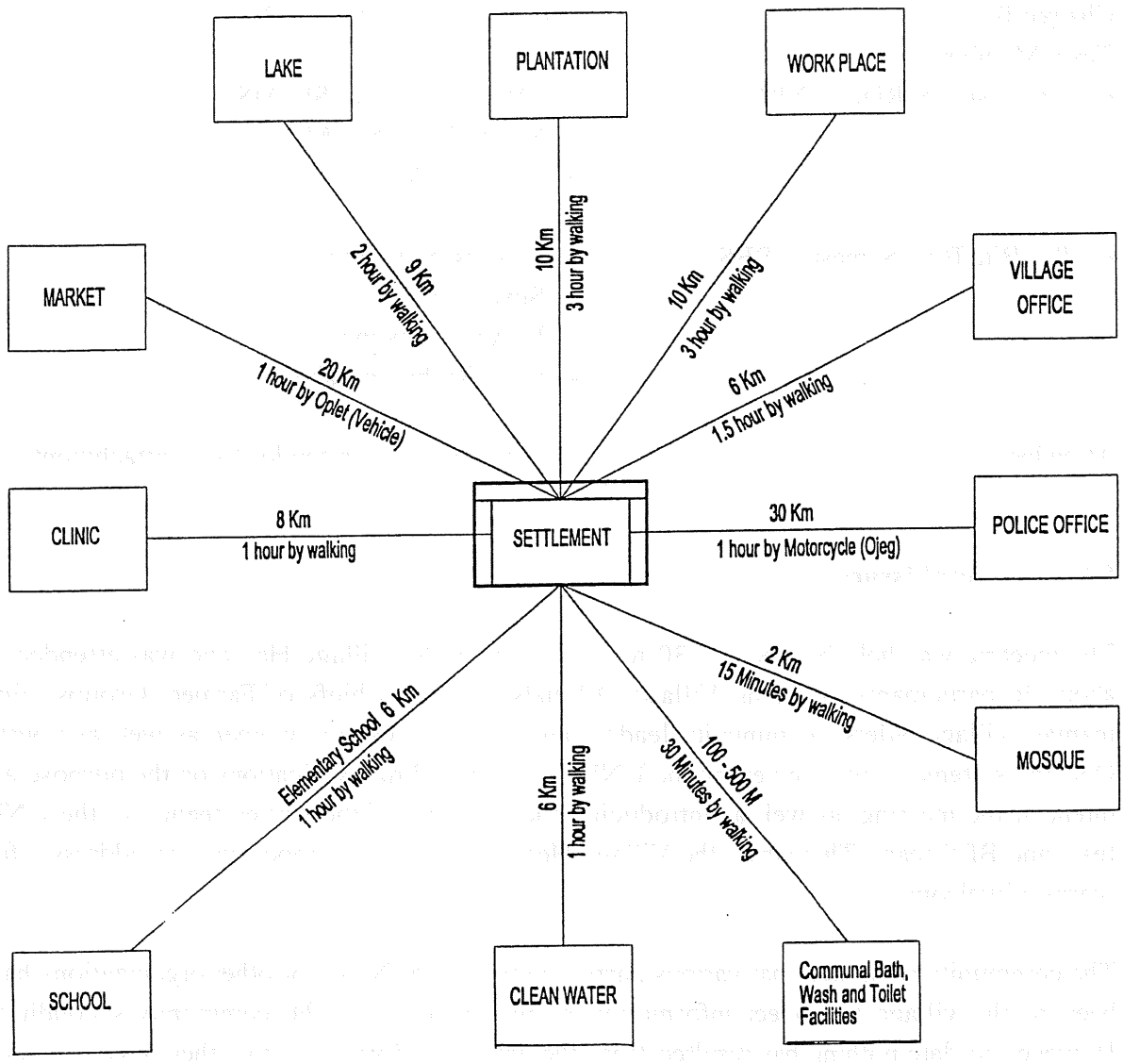
8	Livelihood	9	**112**	5
9	Household Evolution	0	66	7
10	Village Boundary	0	0	0
11	Jadup (Living Allowance)	1	4	21

The PAFs were also queried on the distance and time needed to reach frequently visited places such as rubber plantation, market, school (Elementary, Secondary), places of worship, health clinics, village office etc (See *Figure 4* ').

4.4 Resume of PRA Meeting

1. The results of the meeting at Lubuk Agung indicate that many governmental promises on water supply, MCK, electricity and housing provision pledged prior to their relocation were not realized according to expectations.
2. Some of PAFs believe that compensation, which the government paid to the PAFs was only 10% from budget scheme set by the Japanese.
3. The PAFs of Lubuk Agung complain about the undulating and steep topography of the current location, which is susceptible to landslides, has infertile soil, and is without any water sources.
4. Some PAFs have chosen to leave their government provided houses or move to a new location or even seek a better life elsewhere. These in turn affects the educational attainments of their children, of which many are compelled to drop out of school.
5. The government pledge on provision of rubber plantation turn out to be lies, the new location did not even have any plantations.
6. Currently, live for the PAFs is very difficult, as most of the government promises were never kept.
7. According to PAFs, three problems need to be solved as soon as possible are land compensation, livelihood and living allowance.

Figure 4
Distance to Important Facilities Diagram in Lubuk Agung Village



5.0 BATU BERSURAT VILLAGE PRA MEETING

Name of Village	:	BATU BERSURAT VILLAGE
Date	:	March 6, 2002
Time	:	07.30 – 10.30 p.m.
Chaired By	:	DR. SUARDI TARUMUN
Team Members		
• University of Riau (UNRI)	:	1. GME. Manurung, SP, MSi 2. Ahmad Rifai, SP, MP 3. Ir. Lumen Mundi
• PT. Bita Bina Semesta (BBS)	:	1. Ir. Agust Siswanto 2. Suyono, SH 3. Ir. Agus Darsono 4. Ir. A. Rachman Sabiro
Attendees	:	46 Participant (see attendee list in attachment)

5.1 General Issues

The meeting was held between 07.30 to 10.30 p.m. at the Village Hall and was attended by about 46 participants including Village Officials, LKMD, Chiefs of Farmers Groups, ninik mamak (village elders), community leaders and religious leaders, women as well as youths. Opening statements were given by the UNRI Team including explications on the purpose and intent of the meeting, as well as introducing the members of the survey team, i.e. the UNRI team and BBS team. Thereafter, the Village Head was given the opportunity to address a few words of welcome.

The community remarked that various parties comprised of NGO, or other organizations have been to the village to collect information as well as data on the community's condition. However, to date nothing has resulted from the data and information that they have provided. Hence, the community hopes that this meeting will be beneficial against finding a solution to the issues related to the people's relocation from the old village, in particular with respect to land compensation.

A. PAF'S General Impression On Current Conditions

In general the community feels that they are victims and have been deceived by the government. Almost all agreed that none of the promises made by the government have been fulfilled. Hence, the community no longer trusts the government.

Batu Bersurat is the capital of the Sub-District of Tiga Belas Koto Kampar. Hence, supporting facilities and utilities are in better condition than those in the region's other villages. Positive impacts generated from the Kotapanjang HEPP project include better circulation of transportation as the Batu Bersurat Village is located nearer to the provincial state road, this being approximately 3 km. In addition, the community is served by a telephone network even though only a small portion of the community owns a telephone set at home.

Negative impacts arising from the project include lower earnings, as their rubber plantations have not begun to produce.

5.2 Specific Issues

A. Land compensation

1. PAF impression on governmental pledges

   The PAF feel that the government has deceived them as only 20% of the governmental pledges have been kept. Notably, they feel that the sum established for each square meter of land was too low, but the PAFs were not allow to negotiate. Some of the people to date have not received any compensation money from the government. The unpaid land compensation is due to rejection from some of the community, hence payment is still pending. However, almost all the PAFs agreed that the land compensation was insufficient and abnormal. Court yard was recompensated at Rp 700 /m2, garden at Rp 30 / m2, rubber tree at Rp 2500/ tree. The entire community considers these figures as abnormal. The government also promised to provide Rp 70,000, for relocating graves, however this promise was not kept.

2. Community efforts to file land compensation claims to the government

   To date, efforts by the community to resolve this issue is to hold dialogues with the government and associated agencies, but alas with no results.

3. PAFs Suggestions and Recommendations with respect to land compensation
   Various recommendations and suggestions from the PAFs to overcome the compensation issue include :

   - The compensation amount that has and not yet been paid should conform to the sum agreed between the PAFs and the Government. Accordingly, all the land that has received compensation should be repaid with the real sum.
   - If repayment is carried out, the PAFs demand that it be carried out without the intervention of middlemen.

B. Clean Water Supply

1. Governmental Pledges for Clean Water

The government hitherto pledged to provide wells, but in reality the 3-m deep wells were empty or dry. Currently, clean water is a significant problem at Batu Bersurat given the absence of a suitable source of clean water. Ground water is located at least 20 m below ground, hence construction of groundwater wells would require substantial funding. When the community moved to the new location no clean water facilities were available. In the dry season, the wells dried up, hence the community has to look for water far from their homes. Those who lived near the lake were better off, but those who lived far away had to walk to get water from the lake. Some bought water from vendors that brought the water from the lake in cars. About 2 years afterwards, the government provided constructed clean water facilities. The source was groundwater from a drilled well that was contained in tank reservoir (PAM model) and distributed through pipes to the houses. However, this project was never terminated and never used as the water produced by the well was unsuitable for consumption even though the money budgeted for this project was quite substantial (about 1 billion). When compared with the village of Tanjung Pauh, in Sumatera Barat, this situation is quite deplorable as the people there were able to construct clean water facilities capable of supplying water to many houses for only Rp 15 million (donation from a Japanese student that was doing some research in Tanjung Pauh village).
Given the total failure of this project, the community no longer wants to construct water facilities that emulate the PAM model. The community suggests that a well be constructed at every house, even though it would be very deep.

2. Community Efforts

Efforts undertaken by the community to overcome the water problem is to self-construct wells. However this recourse is taken by those who have the means, whereas those who can not afford it, must either collect water from the lake or collect rainwater.

3. Suggestions proposed by the community are for the government to construct groundwater wells for each household or at least public drill well.

C. MCK Facility

1. Governmental Pledges

The government made no specific promises to provide MCK facilities, however it was the understanding of the community that such facilities would be included as part of housing facilities. Nevertheless, in reality the new houses were without any bath and washing room. Whereas, latrines were provided but these were unsuitable for use.

Currently, about 50% of the households have no toilets, therefore they use the rivers or discharge bowel movements anywhere and bury it (some even put it in plastic bags and throw it in bushes near the house). Most of the toilets constructed by the government no longer are in use as some of them have broken down or are unsuitable for use.

2. Community Efforts to Make the Government Fulfill Their Pledges

The community have endeavored to obtain fulfillment of governmental promises by addressing their grievances to the Regent of Kampar, however to no avail. Therefore, in order to overcome the MCK problem, those who have the means have constructed their own MCK. Needless to say, this is only a small number of the community. The rest of the community is compelled to use their back gardens.

3. Community suggestions

In general, the community suggests that permanent WCs be constructed for every house, whereas bath and washing places could be built communally.

E. Provision Of Electricity

1. Governmental Pledges

Hitherto, the government pledged to provide electricity. The owners need only press the light switch to turn on the lights in the new houses. In addition, the electricity would be installed free of charge and free monthly electricity consumption. However, in reality when they moved to the new location no electricity was available. The community had to wait 2 years before any of the houses had electricity and even then the community had to pay a fee of Rp 150.000 per house for the installation, as well as being billed for monthly consumption. The community is compelled to queue and wait for electricity connection. The PAFs are treated in the same manner as other people (city dwellers) with respect to obtaining electricity, i.e. they must apply, pay and wait for a long time. An additional problem is that currently their electricity bill is higher than beforehand as previously all paid a flat (an equal) sum as the electric meters were never checked by the PLN employee. However, after some time the PLN checked the meters and apparently the consumption was more than they originally estimated. Hence, the community is compelled to pay more, In general the community can not afford to pay such high bills and they menace the PLN not to cut off their electric current.

2. Community Efforts

With respect to provision of electricity the PAFS have made no efforts to obtain electricity. They leave it to fate.

3. Suggestion

Given that the community hitherto owned the land now inundated by the Kotapanjang HEPP lake they suggest that they be released from paying electricity bills and that the money that they have already paid out be reimbursed. They consider themselves to be stakeholders with rights to royalty. Therefore, they should be allowed to enjoy free electricity.

F. Provision of Housing

1. Governmental pledges

Hitherto the government pledged to provide type 36 semi permanent houses, i.e. lower half from cement and upper half from appropriate quality wooden planks. However, in reality the houses were constructed entirely from wooden walls, with thin layer cement flooring unsuitable for use.

2. Community Efforts

The community has tried to petition the government, in particular with respect to the roofing, which originally were from asbestos but were replaced with corrugated iron after the people voiced their protests.

3. Community Suggestions

The community recommends that the government keep their original promises to provide semi permanent housing.

G. Rubber/Palm Oil Plantation

1. Government pledges

The community's main source of income is from the rubber plantation. Hence, these plantations represent an important issue. Compensation for their old plantations did not conform to normal prices. Prior to moving to the new location, the Government promised to provide at their new location rubber plantations ready for harvest or at least almost ready for harvesting (3 years old). However, in reality the community found no rubber plantations, the trees had not even been planted. Whereas, funds for developing the rubber plantation were available, but the project managed by the government experienced a total failure.

2. Community Efforts

In respond to harsh petitions (demonstrations in collaboration with other villages) from the community as well as the fact that rubber is the main source of livelihood, after 5 years the Government of Riau Province provided funds to plant rubber in 1999. Currently, the trees are only 1-2 years old, and the community must wait a further 3 years before they can commence to harvest the rubber. This current rubber plantation project is relatively successful as it is managed by the community without participation from the regional government with the exception of provision of funds.
Delay in development of the rubber plantation has made the community destitute and has wounded the people's hearts. In order to fulfill daily needs some of the community is compelled to return to their old village as some of their old trees are not under water. Some of the community in order to survive is compelled to accept any available work, such as hard labor in Bangkinang, or hiring themselves out as farmers to neighboring villages in West Sumatra.

3. Community suggestions

The community suggests that they be provided with living expenses until the rubber tress start to produce rubber.

H. Income

1. People's income after relocation to the new settlement.

The community's source of income prior to moving to the new village were rubber plantation, palm oil (2 x 1 year), fruit trees such as orange and raising animals.
After moving to the new location, their source of income changed, as conditions in the new location were quite different from their old village. Some of the people changed profession and looked for fish in the lake (dam). Given that the lake's original surface increased the amount of fish also accrued. However, currently the number of fish is decreasing due to over fishing from the high number of fishermen, whereas the number of fish and surface area is insufficient. Other means of livelihood include gambir trees that they planted when they first moved to the new area but the number is quite low. Others in the community seek work elsewhere as plantation laborers, coolies, illegal logging, construction workers etc. According to a PPL individual (Hamdan) present at the meeting, the Batu Bersurat Village represents the village with the most deplorable economic condition amongst all the villages in Tigabelas Koto Kampar District.

This condition is attributed to the outlying distance between the houses and the plantations, hence the plantations go neglected as the owners rarely come. If the owners come and stay for a week there is no daily subsistence in place.

2. Community Suggestion

Given the above description, the PAFs suggest that they be allocated additional living expenses (JADUP) to allow them to appropriately look after their gardens.
The PAF suggest that they be allowed to develop floating cages in the lake as a new source of livelihood in order to increase income. In addition, they request that be provided with new fish catching equipment and skills on fruit cultivation

I. Non Government Organization (NGO)

1. The presence of NGO

General respond with respect to NGO is positive. A part of the community considers the presence of NGO in a negative manner due to the unrealistic promises given by the latter. This in turn has generated conflicts within the community from those who are for and contra. According to the community to date, no NGO have officially entered the village of Batu Bersurat.

2. NGO Activity

To date no NGO activities have been noted to improve the economic situation of the community.

3. Number of NGO visits

The community reported that they have never been visited by an NGO.

5.3 Other findings

1. In general the community feels that life in the new village is much more difficult than in the old village. However, many of the people who attended the meeting came in motorcycles.
2. With respect to housing, 25 % of the houses in Batu Besurat have been renovated to become permanent houses, whereas the rest is still in their original condition.
3. The outlying distance of the rubber plantation from the settlement compels the inhabitants to stay for a week at their plantations.
4. Transportation to the plantation is troubled due to the broken down bridge.
5. The inhabitants reported that the soil at Batu Bersurat Village consists of napal (clay), hence it is difficult to obtain water.

Priority ranking with respect to issues that must be resolved in priority based on polling the people's opinion are as follows :

1. Rubber plantation: the inhabitants hope that they be provided with sufficient assistance (for example additional jadup) to allow them to look after their rubber

plantation and that the bridge be repaired so that they can use vehicles to go to their plantations.

2. Compensation: the inhabitants request that the compensation sum be reconsidered.
3. Clean Water and MCK: the inhabitants demand that the government provide MCK and clean water facilities for the community.

The results are as follows:

PRIORITY OF PROBLEMS SOLVING IN BATU BERSURAT VILLAGE

NO.	TYPE OF PROBLEM	Priority 1	Priority 2	Priority 3
1	Land Co,pensation	0	24	2
2	Rubber/Palm Oil Plantation	32	8	4
3	Clean Water Supply	2	6	36
4	Electricity	0	0	0
5	House Condition	2	4	2
6	MCK	0	0	0
7	Road Condition	0	2	6
8	Livelyhood	8	4	3
9	Household Evolution	0	0	0
10	Village Boundary	0	0	0
11	Jadup (Live Guarantee)	4	12	8

The PAFs were also queried on the distance and time needed to reach frequently visited places such as rubber plantation, market, school (Elementary, Secondary), places of worship, health clinics, village office etc (See *Figure 5*).

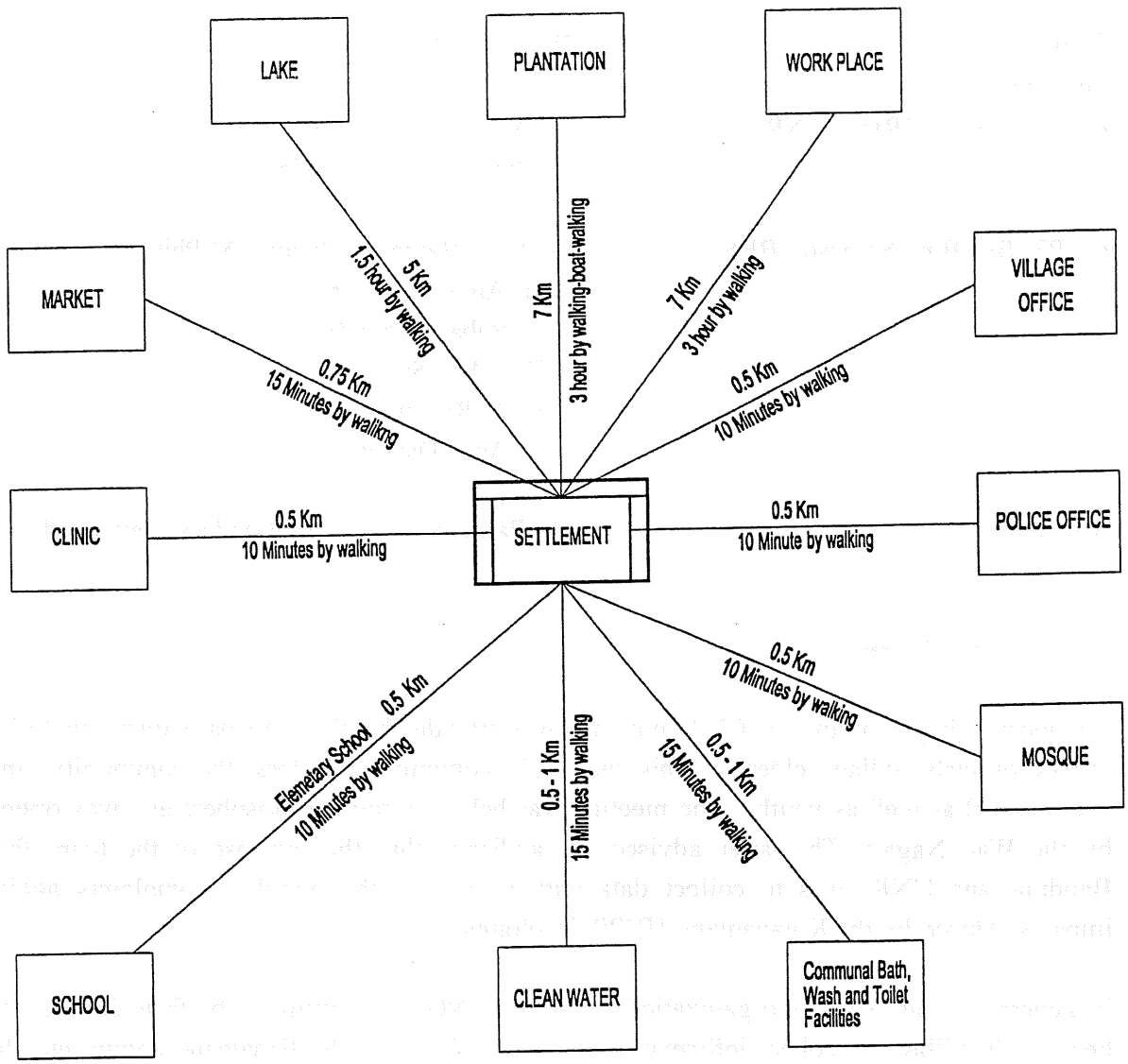
5.4 Resume of PRA Meeting

1. The PAFs described that the negative impacts arising from the Kotapanjang Project include lower earnings, as their rubber plantation have not begun to produce.
2. With respect to the compensation issue, the PAFs feel that the government has deceived them as only 20% of the governmental pledges have been kept. Notably, they feel that the sum established for each square meter of land was too low, but the PAFs were not allow to negotiate. Some of the people to date have not received any compensation money from the government.
3. The government hitherto pledged to provide wells, but in reality the 3-m deep wells were empty or dry. Currently, clean water is a significant problem at Batu Bersurat given the absence of a suitable source of clean water.
4. The government made no specific promises to provide MCK facilities, however it was the understanding of the community that such facilities would be included as part of housing

facilities. Nevertheless, in reality the new houses were without any bath and washing room. Whereas, latrines were provided but these were unsuitable for use.

5. Hitherto, the government pledged to provide electricity. The PAFs need only press the light switch to turn on the lights in the new houses. In addition, the electricity would be installed free of charge and free monthly electricity consumption. However, in reality when they moved to the new location no electricity was available.
6. Hitherto the government pledged to provide type 36 semi permanent houses. However, in reality the houses were constructed entirely from wooden walls, with thin layer cement flooring unsuitable for use.
7. The Government promised to provide at their new location rubber plantations ready for harvest or at least almost ready for harvesting (3 years old). However, in reality the community found no rubber plantations, the trees had not even been planted.
8. Currently, Some of the people has work as fisherman in the lake (dam), cultivating gambir trees, plantation laborers, coolies, illegal logging, construction workers etc.
9. General respond with respect to NGO is positive. According to the community to date, no NGO have officially entered the village of Batu Bersurat.
10. According to PRA meeting, the priority problems, which should be solved as soon as possible are rubber plantation, compensation as well as clean water and MCK.

Figure 5
Distance to Important Facilities Diagram in Batu Bersurat Village



6.0 BINAMANG VILLAGE PRA MEETING

Name of Village	:	BINAMANG VILLAGE
Date	:	March 6, 2002
Time	:	02.00 – 05.30 p.m.
Place	:	Village Musholla (Binamang Prayer House)
Chaired By	:	IR. LUMEN MUNDI
Team members		
• University of Riau (UNRI)	:	1.GME. Manurung, SP, MSi 2. Ahmad Rivai, SP, MS
• PT. Bita Bina Semesta (BBS)	:	1. Dr. Ir. Bambang Panuju, M.Phill 2. Ir. Agust Siswanto 3. Ir. Baban Suhendar 4. Drs. Ano Sumarno 5. Ir. A. Rachman Sabiro 6. Ir. Agus Darsono
Attendees	:	83 Participants (list of attendees is attached)

6.1 General Issues

The meeting began at approx. 02:00 p.m. and was attended by about 83 participants including village officials, village elders ("ninik mamak"), community leaders, the community (men and women) as well as youths. The meeting was held in a relax atmosphere and was opened by the Wali Nagari. The latter advised the audience that the purpose of the team from Bandung and UNRI was to collect data with respect to the people's complaints against impacts induced by the Kotapanjang HEPP development.

In general, to date various organizations as well as NGOs claiming to be from Japan, have been to the village to collect information and data. Thus far, the Binamang community has been providing data, but nothing to date has been coming out of all the information that they have been giving. Therefore, if this meeting is only to collect data without any concrete follow-up, the Binamang Village have no desire to provide information as they are fed up and wearied by all the queries posed by the team without there being any positive results.

For this meeting, the people hope that today's meeting would produce some positive results that would help the sustainability of the lives of the people that are victims of the Kotapanjang HEPP project, notably Binamang Village. However, should the results of the meeting and study not produce any follow up or results for the community of Binamang Village, this will be the last time that the community is willing to give information.

A. PAF's general impression on current conditions

The community feels that their current situation is very different from their condition prior to the existence of Kotapanjang HEPP. In the old days (previous kanmpung), even though they lead simple lives the people had livelihoods, such as tapping for rubber, rice farming, cultivating coconut etc which was enough to support the people. However, since the arrival of the Kotapanjang HEPP project, the rubber trees and rice fields have disappeared.

Currently, the only recourse left to the community of Binamang, approx. 99 % goes to the lake to catch fish. The results obtained from the fish catching when compared with the rubber and rice-farming activities in the old kampung are very disparate. Previously, the people of Binamang Village were able to live and sent their children to school from their gains earned by cultivating rubber, rice, coconut etc. But nowadays, many of the parents can not afford to send their children to secondary schooling such as Junior/Senior High School. This is attributed on one hand because the schools are located too far from Binamangan Village, i.e. in Bangkinan, and on the other hand because the people lack the means or money to send their children to school.

Currently, the weekly income of the Binamang Villange community from catching fish is1 kilo of fish, produces Rp 27,000.-, . This sum is not enough to support the community much less to send the children to school.

B. Impact of the changes planned before the inundation, which in the end is unfavorable to the community.

In general the plans and promises made by the government before the inundation were very admirable and would improve the people's circumstances. However, in reality most of the pledges were not kept. This has made the people's lives lamentable, notably with respect to the rubber plantations that to date can not be harvested. Therefore, the people have no fixed means of resource. In addition, the people have difficulties in obtaining water.

B. Examples of some positive and negative impacts arising from the Kotapanjang Dam development.

1. Positive Impact

   Some of the positive impacts to the community generated from the Kotapanjang HEPP project include:

   - Availability of electricity for the community just like other areas.
   - The availability of roads that make the people's lives easier, as the old kampung was located ± 13 Km from the state roads, whereas currently the new kampung is only ± 3 Km away.
   - A new source of income, this being catching fish. However this new resource currently can not become a source of sustenance.

- Currently the new kampung has a telephone network, which allows the people to communicate.

2. Negative impact

Examples of negative impacts arising from the Kotapanjang HEPP include:

- Currently the people feel that their circumstance is more appalling than in the old (previous) kampung. In the old kampung, even though they lead simple lives, they could at least still buy daily needs from the earnings generated from their rubber, rice, coconut etc. Their earnings were enough to live and educate their children. However, currently the people do not have enough income to fulfill daily needs. No rubber to tap, no rice fields, no coconuts etc. They can only depend on their earnings from catching fish in the lake, however the net results is not enough to live on much less to send the children to school.

  Pak Ahmad Datuk narrated, beforehand I owned a rubber plantation with 4 children, 2 in elementary school and 2 in secondary school and I was capable of sending them to school. However, currently with 2 children, 1 in Elementary School and the other in Secondary School, I may soon have to stop (*not have the means*).

- When the community lived in the lower kampung it was not difficult to obtain clean water as the area was located downhill. Currently, it is difficult for the community to obtain clean water as the area is located uphill. They are compelled to collect rain water and even this is not enough.

6.2 More Specific Issues

A. Land Compensation

1. Compensation pledged by the government

Several opinions were given with respect to the land compensation that the community hitherto received, this being :

a The community requests that the compensation that they hitherto received be reexamined as they feel that the sum established by the government was too low and that they were compelled to accept it, such as :

- At that time a coconut tree was appraised at Rp. 4.800 / tree. Currently, the price of 1 coconut is Rp. 1.200 per fruit. Therefore, the compensation money received for 1 tree can currently buy only 4 coconuts, whereas 1 tree can produce many coconut fruits.

- The people's rubber plants that at that time were ready for harvesting (tapping) were appraised at Rp.2.500 per tree, whereas it would now need Rp. 25.000 per tree if they must wait and care for the rubber trees.
- Rice fields, which is the economic source of the community and produces 2 annual harvests were only compensated at Rp. 500 per M^2 and represents an irrigation field.
- Durian trees were appraised at Rp. 6.000 per tree. Yesterday, we bought durian at Rp.5.000 per fruit, whereas the trees when they are fruiting are very abundant.

b The community queried on the land compensation table established by the Japanese, whether it is the same as the amount received hitherto by the community.

c Some of the inhabitants feel that they have not been compensated for their land plots.

2. Community efforts to submit land compensation claims to the government.

a. Some of the people are trying to claim the Pemda for land compensation, however to date they have received no response.

b. By presenting the land compensation issue to parties coming to the village for the purposes of collecting data, with the hope that this issue will be forwarded on to the government and in turn would lead to follow up actions or closure which would satisfy the people's wishes.

3. PAFs suggestions in order to solve the land compensation issue

Some recommendations and suggestions given by the community with respect to the land compensation issue include :

a. The community suggests that the amount of the compensation money that they received be reexamined and adjusted against the 1993 prevalent market value of land.

a Some community members requested that the land compensation table established by the Japanese be issued and compared against the amount that they received, which in turn should be reexamined and adjusted with the amount given in the Japanese table.

B. Clean Water Supply

Some opinions were given with respect to this issue, this being that hitherto the government pledged to provide clean water in the houses. However, in reality the promises were not kept, the community received no clean water facilities when they moved to the new location.

1. To date the community feels that governmental efforts to improve clean water provision in Binamang Village is very insufficient. The government has only assisted by constructing several dug wells in people's homes, however the results are not satisfactory, as many of the constructed wells contain no water.

2. Some suggestions and recommendations given by the community with respect to provision of clean water :

   a. Some of the people ask for funds to construct wells at each house.
   b. Where it is not possible to construct wells at each individual house, the community asks that 4 drill wells be constructed that could serve the needs of the entire Binamang Village community.

C. MCK Facilities (Bath, Wash and Latrine)

1. With respect to this issue, hitherto the government pledged to provide each house with MCK, whereas in reality
   a. Only 20 % of the MCK can be utilized, as no septic tanks were constructed.
   b. Some of the MCKs were erected in front, hence the people felt uncomfortable and dismantled them.

2. The people of Binamang Village to date feel that the government has made no efforts or endeavors to improve or repair the non-functioning MCK facilities.

3. In order to overcome this problem, the people request that each house is given an MCK.

D. Provision of electricity

1. With respect to the provision of electricity, prior to being relocated the government promised the community that when they moved they would find electricity in each house and free cost of installation as well as free electricity consumption for a full year. However, in reality the community found:

   a. that they had to pay for the installation of the electricity
   b. that they had to paid for the 1 year consumption that was originally promised for free
   c. that approximately 20 % of the community have no electricity as they could not afford the cost of installation.

2. Although the community/PAF have voiced their complaints, the community feels that to date the government never responded or acknowledged the protests.

3. Suggestions and recommendations proposed by the community with respect to the provision of electricity include :

a. The community requests that the government keep their promise. They ask the government to return the cost of installation and the money paid for a year's consumption of electricity.
b. Some of the community are asking for royalty from PLN, though not in the form of money but free electricity on a continuous basis.

E. Provision of Housing

1. With respect to the provision of housing the government hitherto promised to construct type 36 semi permanent houses, with roofs from asbestos and cement plastered flooring. However in reality :

   a. The houses were 6 by 6 m constructions made from wooden planks (temporary), which the community considered as exigency housing.
   b. With respect to the roofing, from the beginning the community strongly rejected to having roofs made from asbestos but preferred having them from corrugated iron in order to collect rain water, whereas asbestos itself could be toxic.
   c. The cement plaster flooring was in very poor condition, mixed with dirt.

2. To date, the community feels that the government has made no efforts or endeavored to improve the condition of the houses to conform to their previous promises.

3. Recommendations and suggestions proposed by the community with respect to their housing are:
   - A part of the community requests compensation to renovate the wooden houses that they obtained, by calculating the cost per m^2 of a semi-permanent house.
   - The discrepancy in sum should be given to them to repair their houses.

F. Rubber plantation

1. Hitherto the government pledged that when the community moved to the new location (upper kampung) they would find 3-year-old rubber trees ready for harvesting. However, in reality the community found:

   a. The promised rubber plantation were not planted or didn't have any rubber trees, much less trees ready for harvesting.
   b. The location of Desa Binamang's rubber plantation is far from their village, about 7 – 10 km and found in 2 locations. In order to attain the first location one must go by foot and boat for ± 1.5 hour, whereas to reach the second location one must go by foot and cross a river without any bridge, hence one must swim for ± 1.5 hour. Accordingly, to reach the plantation, the people of Binamang Village need about 3 hours, or 6 hours for a round trip.

2. Efforts undertaken by the government to ameliorate the rubber plantation of Binamang Village include:

   a. During Mr. Muslimin Nasution's tenure as Minister of Agriculture plans were made to replace the rubber plantation with palm oil. However, when the gentleman was no longer Minister, The Governor of Riau, Mr. Saleh Yasid stated that the soil of this location was not suitable for palm oil, hence the plans were called off.
   b. Recently in 2000 the government replanted the community's rubber plantation by having the community participate in its maintenance. Accordingly, the government provided each household with Rp. 1,060,000.- , which was given gradually in 3 installments over a year.

3. The recommendations and suggestions proposed by the community of Binamang Village in order to overcome problems associated to the rubber plantations include:

   a. Construction of a road and bridge so that the community have access to their rubber plantations.
   b. Increase by 3 – 4 times the amount of money for maintenance given that the location of their rubber plantation is far, hence when they go to their plantations they need to leave something for their families (wives and children). Whereas, the rubber plantation itself is not yet producing anything.
   c. Request that foster or PIR pattern is implemented.

G. Income

1. Change in the community's source of income as a result of the Kotapanjang HEPP project include:
   a. Prior to moving to the new location, the livelihood of the Binamang Village community included various activities or sources such as rubber, rice farming, selling coconut, coffee etc. The community felt that these activities provided them with enough to live on and send their children to school.
   b. When they lived in their old village, the community did not need to buy goods needed for their subsistence, such as rice, coconut etc. However, nowadays they must buy everything and at very expensive prices, whereas they have no income.

2. Efforts undertaken by the community to increase their income include:
   - Catching fish, however this is insufficient.

3. Recommendations and suggestions proposed by the PAF in order to improve their income include:
   a. Provision of daily allowance ("Jadup") or living expenses for 1 – 2 more years.
   b. Provision of capital or loans or tools to catch fish or undertake animal husbandry.
   c. Seeding of fish in the lake, in order to aid the community's endeavors to catch fish.