Indonesia

Rural Electrification Project(2)

Field Survey: August 2003

1. Project Profile & Japan's ODA Loan

Indonesia, excluding Java-Bali

A small diesel generator

1.1 Background

In Indonesia's sixth five-year National Development Plan (REPELITA VI: FY1994/95-FY1998/99), with the objective of improving living standards and of rectifying inter-regional gaps, it was planned to electrify 18,619 of the non-electrified villages (kampungs) , and electrification projects were in fact implemented in line with this development target. However, as of the end of 1995, the rural electrification rate[1] was 63.6% (household electrification rate: 41.7%), and 49.9% (33.5%) for communities outside the Java-Bali grid, thus still low; accordingly, the government of Indonesia submitted requests for funding to accomplish its plans to the World Bank and the Japanese government.

This project is the successor (Phase II) to the "Rural Electrification Project (conclusion of loan agreement: November 1993; final disbursement date: December 1997)"[2] that was also executed under ODA loan.

1.2 Objective

The project's objectives were to improve and increase power supplies to areas outside the Java-Bali power grid by developing rural distribution and generation equipment, and thereby contribute to strengthen responses to poverty reduction in these areas and those to support regional development.

1.3 Output

[1] This indicates the percentage of villages that have some form of electrical supply grid.

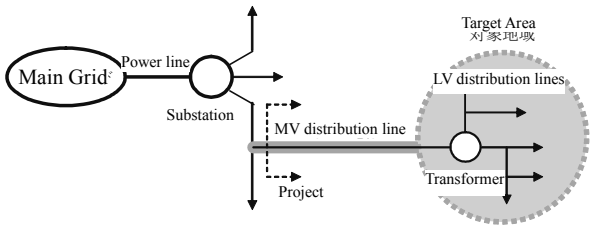
[2] This project involved the electrification of 851 villages in 22 provinces outside Java, the procurement and installation of six scattered diesel power generators for the islands of Belitung, Kalimantan, and Sulawesi and the construction of a small hydropower generator on Kalimantan.

Project plans called for the procurement of the following equipment and the electrification of 670 villages in 21 provinces outside the Java-Bali grid (400 villages in 1997/98; 270 villages in 1998/99). Two methods of electrification were employed: on-grid electrification and off-grid electrification (i.e. independent systems). The former method involves diverting or constructing new power lines from an existing grid to target villages, the latter involves the installation of small diesel generators in target villages and the construction of an independent grid system (see Figures 1 & 2).

- Construction of distribution line

- Medium-voltage (MV) distribution lines (20kV): 2,963km
- Low-voltage (LV) distribution lines (380V, 220V): 2,057km
- Transformers (20kV/380V, 220V): 44,200kVA

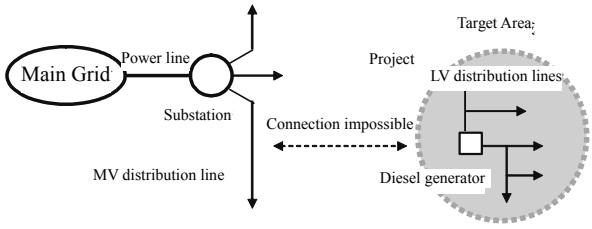
Figure 1: On-grid Electrification: A Concept Diagram



Source: Appraisal data

- Installation of small diesel generators: 77units, 6,440kW

Figure 2: Off-grid Electrification: A Concept Diagram



Source: Appraisal data

1.4 Borrower / Executing Agency

Republic of Indonesia / Perusahann Umum Listrik Negara (PT.PLN (Persero): the State Electricity Corporation)

1.5 Outline of Loan Agreement

Loan Amount Disbursed Amount	6,115 million yen/ 4,897 million yen
Exchange of NotesLoan Agreement	December 1996/ December 1996
Terms & Conditions Interest Rate Repayment Date (Grace Period) Procurement	 2.7& 30 years (10 years) General untied
Final Disbursement Date	December 1999

2. Results & Evaluation

2.1 Relevance

The sixth five-year (1994-98) national development plan (REPELITA VI) that was current at appraisal defines as its goal electrification of a total of 18,619 villages: 5,065 villages on the Java-Bali grid and 13,554 villages outside the Java-Bali grid, i.e. a nationwide electrification rate of 75 percent, with the aim of raising living standards and alleviating inter-regional gaps (see Table 1). The plans for this project were highly relevant to obtaining the policy goals of the Indonesian government as stated at the appraisal time point.

Table 1: Planned Rural Electrification under REPELITA VI (No. of villages)

	1994/1995	1995/1996	1996/1997	1997/1998	1998/1999	**REPELITA VI**
Java	916	933	998	1,127	1,131	**5,105**
Outer islands	2,425	2,473	2,641	2,983	2,992	**13,514**
Total	3,341	3,406	3,639	4,110	4,123	**18,619**

Source: PT.PLN

Electrification of rural communities was positioned as a priority issue in the national development plan (PROPENAS: 2000-2004) that was current at evaluation, and the new electricity law (No. 20, approved in 2002), which defines new approaches for the power sector, also underscores the need for continued efforts by the central and regional governments to promote electrification[3]. Accordingly, the relevance of the project plans has been maintained to the present day.

2.2 Efficiency

2.2.1 Outputs

[3] Details of the current framework for rural electrification based on the new electricity law are outlined in "2.5 Sustainability".

The target regions are as per the original plans. The plans called for the electrification of 670 villages outside the Java-Bali grid, and this number was in fact increased to 711 villages within the target area. This increase was made using equipment already owned by PLN prior to the project. In addition, because PLN was unable to secure funds to implement its own rural electrification project due to the affects of the economic crisis in Indonesia, the project was developed with the aim of improving the supply situation or increasing the number of electrified households for 206 villages already supplied with electricity. In line with these changes, the procurement of medium-voltage (MV) distribution lines (20kV), low-voltage (LV) distribution lines (380V, 220V) and extra diesel generators was added onto the initial plans. These changes contributed to achieving this project's objective, namely, to promote rural electrification. The villages targeted for electrification were selected on the basis of the following criteria. Added to which, on-grid electrification, which is more economical than off-grid electrification, was given priority.

- Economic efficiency: A high "S-ratio": a quantitative index used by PLN to express the ratio of latent potential for tariff collection to necessary investment costs[4].
- Distance from existing power lines: Less than 3km from an existing power grid, with houses within the community not being overly scattered.
- Significance in terms of the development status of individual regions: The villages have a powerful potential for socio-economic development. With off-grid electrification, a plot of land 500m from the center of the village was secured for construction of a small diesel generator plant.

2.2.2 Project Period

Under initial plans, all construction work was to be executed during the 24-month period between November 1996 and October 1998 (i.e. from L/A signing through the completion of electrification work); however, the actual execution period spanned 37 months, commencing in December 1996 and ending in December 1999. The delays were primarily attributable to (1) the adjustments made to tailor outputs to needs, and (2) political instability in Aceh, Maluku, and East Timor, which led to the deterioration of public order.

2.2.3 Project Costs

Total project costs were 6,554 million yen (80.4% of the planned budget) against the planned figure of 8,153 million yen and were kept within the original budget. These savings sprang from the depreciation of the local currency (rupiah) in excess of inflation due to the economic crisis,

[4] The S-ratio is an index obtained by dividing "the profits from electrification by the investment costs involved." It was calculated for all villages, with the resultant figures tabulated for each province and region, in the antecedent World Bank's master plan.

and lower prices due to competition.

2.2.4 Execution System

The project was executed by project offices established in each of the power supply regions under the supervision of the rural electrification project monitoring section at PLN headquarters. Although consultants were not recruited in the course of project execution, a project execution unit had already been set up within PLN during the course of the Phase I project (rural electrification component) and its work was generally favorable.

2.3 Effectiveness

As shown in Table 2, 711 villages outside the Java-Bali grid were electrified through this project; moreover, the supply situation was improved and the number of electrified households was increased in another 206 villages in the same region. Between 1996, the project start date, and 2002, electricity was supplied to a total of 9,876 villages on outer islands, with this project contributing 7.2 percent to this total. PLN was unable to confirm the number of households that had been electrified via this project during the field survey.

Focusing on the trends, between 1995 and 2002 the village electrification rate on outer islands increased from 49.3 percent to 73.9 percent. In the same period, the rate rose from 86.0 percent to 98.6 in the Java Island, with the result that there was a substantial amelioration of the gap. Also, the household electrification rate on Java increased from 48.7 percent in 1995 to 58.0 percent in 2002 as compared to 32.9 percent to 44.0 percent on outer islands, thereby confirming that the gap for this parameter has also diminished (see Figures 3 & 4)[5].

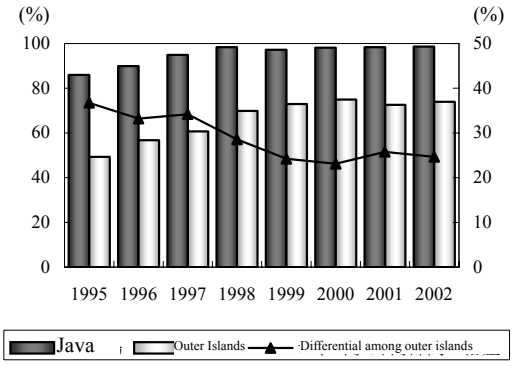
[5] Between 1995 and 2001, Indonesia's national electrification rate increased from 63.6% to 82.4% and the household electrification rate from 41.7% to 52.1%.

Table 2: Project Performance on Individual Supply Regions

Region	Province	No. of villages (New)	No. of villages (Upgraded)	MV lines (km)	LV lines (km)	Transformers (kVA)	Diesel generators (No.)	Diesel generators (kW)
Region I	D.I. Aceh	43	48	139	190	1,430	0	0
Region II	North Sumatra	35	20	157	167	1,565	0	0
Region III	West Sumatra Riau	69	45	180	293	2,942	9	900
Region IV	South Sumatra Jambi Lampung Bengkulu	127	22	526	494	4,824	17	4,090
Region V	West Kalimantan	68	14	422	241	3,000	17	2,420
Region VI	South Kalimantan Central Kalimantan East Kalimantan	136	17	521	432	4,582	27	7,480
Region VII	North Sulawesi Central Sulawesi	55	3	244	135	2,254	10	2,700
Region VIII	South Sulawesi Southeast Sulawesi	94	7	369	458	6,080	5	1,580
Region IX	Maluku	15	0	110	29	760	12	1,510
Region X	Irian Jaya	22	15	134	96	2,420	5	860
Region XI	West Nusa Tenggara East Nusa Tenggara East Timor	47	15	239	199	3,501	11	440
Total		**711**	**206**	**3,033**	**2,734**	**33,358**	**113**	**21,480**

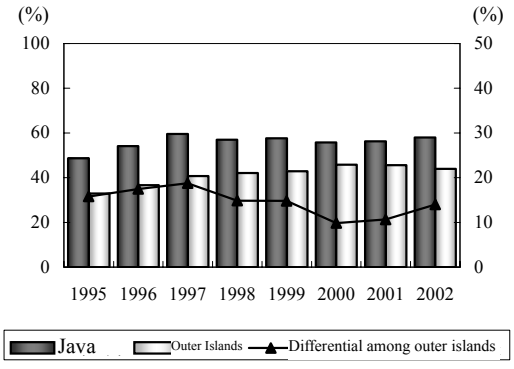
Source: PT.PLN

Fig. 3: Rural Electrification Rate: 1995-2003 (%)



Source: PT.PLN
Note: the left-hand scale is the electrification rate; the right-hand scale represents the differential

Fig. 4: Household Electrification Rate 1995-2003 (%)



Source: PT.PLN
Note: the left-hand scale is the electrification rate; the right-hand scale represents the differential

The beneficiary population was estimated to be 2,245.5 people per village in areas outside the Java-Bali grid at the 1996 time point. The fact that 917 villages were electrified or had their

power supply improved made a total population of around 2.06 million beneficiaries. This equates to approximately 2 percent of the total population in the target areas.

2.4 Impacts

2.4.1 Improvements in Regional Economies / Societies & in Living Standards

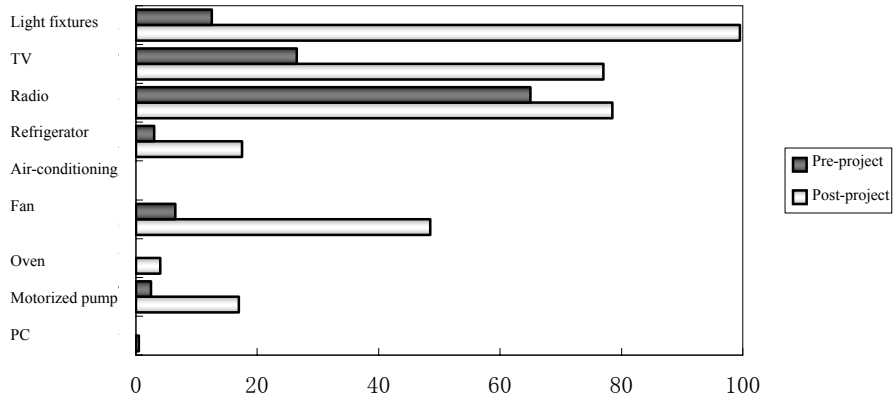
Fig. 5: Beneficiary opinion survey in progress

With the cooperation of PLN and KUD (*Koperasi Unit Desa*: village unit cooperatives) members, as part of this evaluation, beneficiary opinion surveys were undertaken in four villages on the West Nusa Tenggara electricity supply district (part of the former Region XI) and the South Sumatra, Jambi, and Bengkulu electricity supply district (part of the former Region IV). The survey's objective was to ascertain project impacts in connection with improvements in the region's economies / societies and the living standards of its people, and the degree of satisfaction (with project outcomes) among its beneficiaries[6]. The KUD are multipurpose cooperative institutions primarily comprising members of the local population, including farmers, farm workers, small traders, fishermen, and day laborers. As stated in section "2.5 Sustainability", many KUD are operating and maintaining project facilities on the basis of contracts with PLN. Fifty members of households (farmers, traders, laborers, etc.) that were supplied with electricity via this project were selected at random and interviewed on the basis of a questionnaire.

The results of the survey demonstrate that since the project was completed local residents are using various electrical appliances, including light fixtures (99.5% of respondents or 199 people), radios (78.5%, 157 people), TVs (77.0%, 154 people), fans (48.5%, 97 people), refrigerators (17.5%, 35 people), and motorized pumps (17.0%, 34 people). It was also confirmed that rice cookers and irons are being used in the villages visited during the survey. Respondents are using many more electrical appliances than they were prior to project implementation, ith the exception of radios powered by rechargeable or dry cell (alkaline) batteries, which were already owned by 65.0% of respondents (130 people) (see Figure 6).

[6] Interviews were conducted in West Nusa Tenggara (Lunyuk district, Sumbawa Prefecture; Kesik village, Masbagik district, East Lombok Prefecture) and South Sumatra (Muara Telang district, Banyu Asin Prefecture; Putak village, Gelumbang district, Muara Enim Prefecture). Of these, the villages of Kesik and Putak were connected to grids (on-grid electrification), while Kelawis and Sumber Mulia were linked to independent systems (off-grid electrification).

Figure 6: Electrical Appliances in Use (Pre-project / Post-project) (%) (Sample = 200)

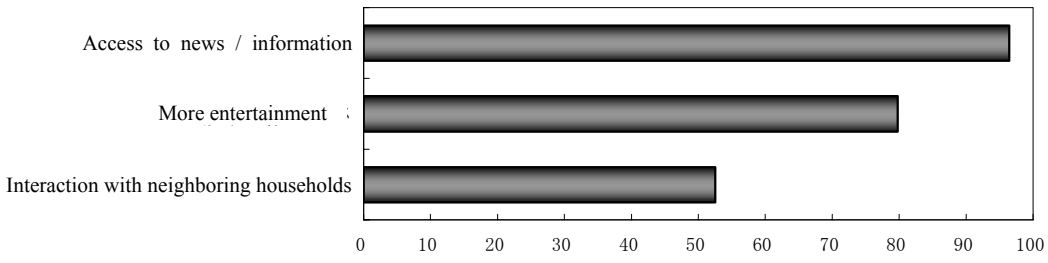


The following sections examine the socio-economic impacts that have been generated by the use of these electrical appliances.

[Improved TV & Radio Access]

On improved access to TV and radio, 66.0% of respondents (132 people) had recognized "major improvements" and 33.0% (66 people) "improvements". These respondents (198 people) were then asked, in connection with the improvements to TV and radio access, to identify which outcomes had produced satisfaction; this question yielded high response rates for better access to news / information (96.5% of respondents or 191 people), more entertainment (79.8%, 158 people), and more interaction with neighboring households (52.5%, 104 people), in that order (see Figure 7). Some respondents were also convinced that easier access to news and information had been instrumental to the educational and religious activities of the children in individual households.

Figure 7: Improvements in TV & Radio Access (%) (Sample = 198)



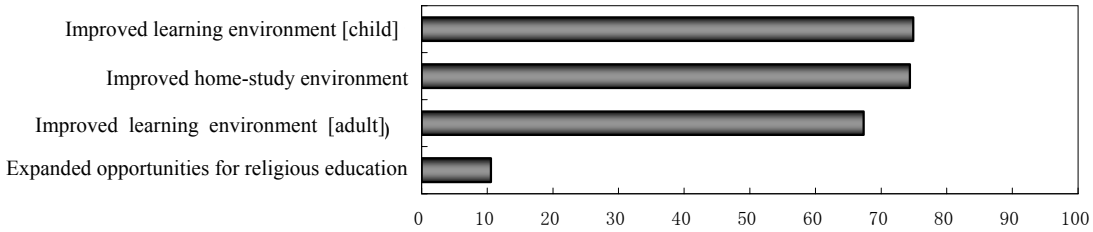
[Improved Learning Environment]

On improvements to the environment for learning, 57.5% of respondents (115 people) had recognized "major improvements" and 42.0% (84 people) "improvements". These respondents (199 people) were then asked to identify which outcomes had been particularly gratifying in this connection, which yielded high response rates for better learning environment for children

(74.9% of respondents or 149 people), a better learning environment in the home (74.4%, 148 people), better learning environment for adults (67.3%, 134 people), and more opportunities to study religion (10.6%, 22 people) in that order (see Figure 8).

In all the villages covered by the survey comments on the fact that it is now possible to study at night, which has enabled the children to tackle the homework they receive from school, and that nighttime readings from the Koran (the Muslim bible) can now be held at mosques were particularly prominent. Through electrification, learning environment improved by disseminating light fixtures to homes and religious facilities and so on, and learning opportunity increased because dissemination of TV and radio led to increase opportunities to obtain information and knowledge.

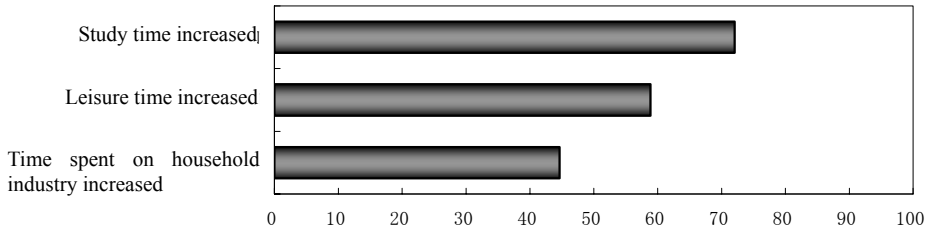
Figure 8: Improvements in Learning Environment (%) (Sample = 199)



[Time Savings on Housework]

On the time saved in performing household chores, 53.5% of respondents (107 people) had recognized “major improvements” and 45.0% (90 people) “improvements”. These time savings spring from the proliferation of electrical appliances such as electric irons, refrigerators and rice cookers, which make housework easier. These respondents (197 people) were asked to identify which outcomes had produced satisfaction in connection with the time savings on housework, which yielded high response rates for more time for study (72.1% of respondents, or 142 people), more leisure time (58.9%, 116 people), and more time to spend on the pursuit of household industries (44.7%, 88 people) in that order (see Figure 9).

Figure 9: Reductions in Housework (%) (Sample = 197)



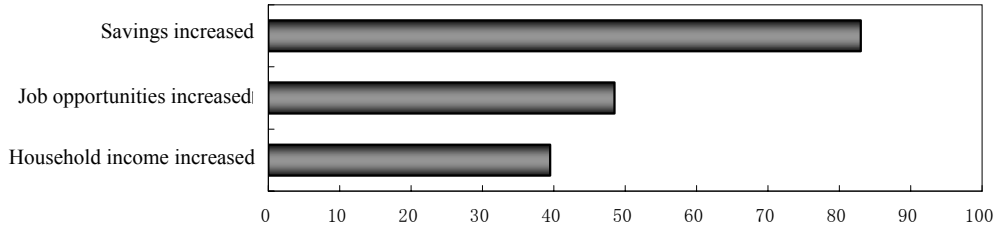
[Stimulation of Local Industries / Job Creation]

On the stimulation of local industries and job creation, 50.5% of respondents (101 people) had recognized “major improvements” and 49.5% (99 people) “improvements”. These respondents (200 people) were asked to indicate which outcomes had been particularly gratifying in this

respect, which yielded high response rates for increases in savings (83.0% of respondents or 166 people), more job opportunities (48.5%, 97 people), and higher household incomes (39.5%, 79 people) in that order (see Figure 10).

In Kesik village, East Lombok Prefecture, for example, villagers have combined farming with the production of roof tiles and bricks since before the project was implemented. They have said that production has increased because, after the project completion, it is now possible to work after sunset. In addition, some households are using electrical appliances to make ice or do needlework, which is enabling them to make extra money. By invigorating industry and creating jobs in rural area, it is suggested that the project is contributing to reductions in rural unemployment rate and thereby reducing the migration of rural populations to urban areas.

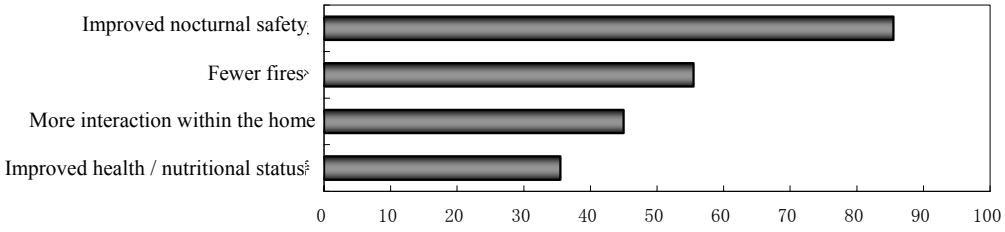
Figure 10: Stimulation of Local Industries / Increases in Job Opportunities (%) (Sample = 200)



[Other Impacts]

Asked about other impacts produced by the project, respondents pointed to improvements in nocturnal safety and public order (85.5%, 171 people), fewer fires because kerosene lamps are no longer used (55.5%, 111 people), more interaction within the home (45.0%, 90 people), and improvements in their health and nutritional status (3.5%, 71 people) (see Figure 11). Installation of street lamps in villages and dissemination of light fixtures, TV and radios by electrification could lead to increase improved nocturnal safety, fewer fires, and more interaction within the home. It led to improve health and nutritional status by obtaining clean water by hauling it out of a well with disseminated electric pump.

Figure 11: Other Impacts (%) (Sample = 200)



Case Study 1: Impacts on Kesik village, Masbagik district, East Lombok Prefecture

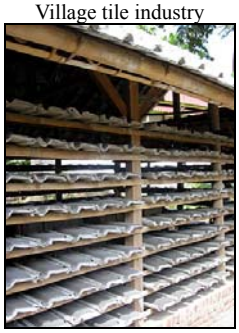
Kesik is a farming village that is located approximately one hour and half by car from Mataram, the main city on Lombok island. It has a population of 7,042 (2,024 households); the main industry in the Punik Agung area targeted by this project is agriculture (rice, tobacco, soy beans, etc.), and some residents earn additional income by making roof tiles and bricks or through needlework. Electrification of other areas in Kesik has progressed steadily since the early 1980s, and since the Punik Agung area was still without power, it requested PLN to connect it to a power grid. By 1997, a majority of this area had been electrified via this project and most of Kesik village was receiving power (on-grid electrification).

With completion of the project all households now own light fixtures, TVs, and refrigerators. Prior to project implementation people used kerosene lamps for lighting, but it was difficult to get kerosene nearby and villagers were inconvenienced. The villagers find it very convenient now that lighting is readily available through electrification.

In terms of major socio-economic impacts, villagers have recognized "a better educational environment for children", "better access to information via the TV", "stimulation of the region's economy", "improvements in sanitation", "improved nocturnal safety" and "fewer fires". The improvements in the learning environment for children were very highly regarded.

Religious studies in progress in a mosque

Village tile industry



Villagers pointed to the fact that at night children are now able to do the homework they receive from school and can also now study the teachings of Islam at the local mosque.

The fact that economic activities in the region have opened up was also highly evaluated. Villagers report that since this project was implemented outputs from small-scale local industries (roof tiles, bricks) have increased as it is now possible to work after dark, if such is required. Some households are also making ice or trading goods. In consequence, although economic development was lagging in the Punik Agung area prior to the project it now compares favorably with other areas in Kesik village. The prefectural government is looking into asphalting the road that runs through the area in a bid to improve access.

2.4.2 Environmental Impact

There have been no reports of any adverse environmental impacts contingent upon the implementation of this project in so far as checked during the course of this survey. A small amount of land was required for the erection of electric poles and a minimal number of treeswas cut down for the installation of power lines and transformers. Moreover, the environmental impact of diesel generators has been kept to a minimum because they are normally operated at night.

2.5 Sustainability

2.5.1 Executing Agency

(1) Technical Capacity / Operation & Maintenance System

There are no problems in this area. Various initiatives are being taken across the power sector, including the financial and organizational restructuring of PLN, the introduction of incremental increases in tariffs to bring them up to an acceptable level, and the deregulation of the power market in a bid to promote private-sector investment, and the sector is expected to return to profit in fiscal 2004 (for details of PLN's finances, refer to the next section).

The operation and maintenance of facilities and equipment that was completed through this project is performed by individual branches (Cabang) of the regional electricity supply district offices (Wilayah) under the supervision of the latter. Furthermore, responsibility for part of or all operation and maintenance activities has been ceded to the aforementioned KUD in some villages (see Table 3). As of the end of 2002, PLN had concluded contracts with 2,245 KUD on outer islands and was outsourcing the operation and maintenance of electric facilities of 18,343 villages, or 64.1% of the total to KUD. By commissioning these operations to the KUD, PLN is able to procure a cheap source of labor, build community ownership of rural electrification facilities and equipment, and supply services that are tailored to the circumstances in a particular region.

The operation and maintenance status of facilities and equipment procured through this project, including the small diesel generators, was favorable in all the villages visited during the course of this survey. The maintenance of diesel generators involves on-site work that is carried out during the hours when the generators are non-operational, on the basis of manuals. After 6,000 hours of operation the generators undergo periodic maintenance, which is performed by staff from the PLN branch covering the area. In the case of Management Service Agreements (MSA), the members of the KUD responsible for operation and maintenance receive training at education and training center prior to the commission as well as OJT (on-the-job training).

Table 3: KUD Patterns & Outsourcing Contract Numbers (as of the end of 2002)

	KUD Responsibilities	No. of KUD (Outer islands)	No. of villages (Outer islands)
Pattern (Pola) I	Meter readings, tariff collection, minor repairs, simple network maintenance, education and training	3,447 (1,525)	31,188 (11,918)
Pattern (Pola) II	Household wiring connections, installation of LV distribution lines, manufacture of simple electrical equipment, simple surveys relating to electrification	77 (49)	380 (224)
Pattern (Pola) III	Both tasks outlined in Pattern I and Pattern II	191 (175)	5,080 (5,038)
Pattern MSA	(On-grid) Network maintenance, meter readings, tariff collection, household wiring connections, installation of LV distribution lines	678 (625)	5,537 (5,092)
	(Off-grid) Operation and maintenance of small diesel generators and independent transmission networks, meter readings, tariff collection, household wiring connections, installation of LV distribution lines		
Total		4,264 (2,245)	38,256 (18,343)

Source: PT.PLN

(2) Financial Status

Losses of Rp. 83,159 million were posted in the profit and loss statement for rural electrification (operation and maintenance) in 2002, based on revenues of Rp. 6,498,217 million against expenses of Rp. 6,581,376 million (i.e. a rate of return of ▲12.8%). This is considered to stem from the low profitability of the electricity business on the outer islands; specifically, a deficit of Rp. 971,618 million was recorded for the outer islands alone, with revenues listed as Rp. 2,293,387 million against expenses of Rp. 3,265,005 million (▲42.4%). This unfavorable balance is attributable to low load density in rural communities, which reduces economic efficiency, and to the high unit costs of supplying electricity from diesel generators[7]; moreover, contracts with consumers are for low-capacity household (450VA or 900VA) contracts, which have exceptionally low tariffs.

Looking at the finances of PLN as a whole, while operating income has increased every year for the past five years, the increases are insufficient to cover operating expenses, which are likewise growing (see Table 4). In consequence, its operating profit figures have been negative for four years in succession (1998-2001). Current term profits moved back into the black in 2001, but this can be attributed to reduced financing costs resulting from changes in interest payable and its loan repayment periods, and to government subsidies (6,735,209 million Rp) from the national budget (APBN), and is not indicative of a recovery in the performance of the electric

[7] For example, since the West Nusa Tenggara electricity supply district visited during this field survey is predominantly reliant on diesel generation average tariffs have remained at Rp. 538/kWh against a unit production cost of Rp. 925/kWh (as of July 2003).

power industry. By contrast, both the liquidity ratio[8], an indicator of short-term stability, and the capital adequacy ratio[9], an indicator of long-term stability, have shown signs of rallying since 2000, with the two figures standing at 40% and 20%, respectively.

As these indices testify, PLN's finances remain in a parlous condition and there are concerns that this will adversely impact on the operation and maintenance of the facilities procured by this project. The deterioration in the state utility's finances has been caused by: 1) increases in power purchase agreement (PPA) tariffs with Independent Power Producers (IPP) (on a local currency base); 2) increases in production costs and specifically, the price of fuel; and 3) low electricity tariffs by comparison with the above; all of which occurred with the collapse of the local currency (Rupiah) against the dollar, contingent upon the economic crisis in Indonesia.

In an attempt to overcome its financial difficulties, PLN is currently raising basic tariffs and introducing regional tariffs, reviewing its contracts with IPPs, and attempting to bolster the efficiency of it operations. In line with the decentralization policy being promoted by the Indonesian government and the newly enacted electricity law, as of January 2003, responsibility for the planning and execution of rural electrification projects was placed with the Directorate General of Power and New Energy of the Ministry of Energy and Mines, while the only responsibility assigned to PLN was to execute the operation and maintenance of facilities placed under its authority. Although rural electrification continues to be an important government development objective it is beset with problems in terms of its profitability, which means that even if only operation and maintenance is extracted, given the enormous financial burden on PLN, it will be necessary to monitor the sustainability of project outcomes carefully. Added to which, there are few people in prefecture; government with the know-how needed to undertake electrical work, and at this time the personnel charged with this responsibility are on loan from PLN, which means that PLN is also having to defray the personnel expenses involved. As this demonstrates, in order to further the effects of rural electrification, the issue for the future will be to restructure the system by strengthening organizational and personnel resources, mindful of the state of PLN's finances.

[8] Liquidity ratio = current assets / current liabilities (indicates solvency)

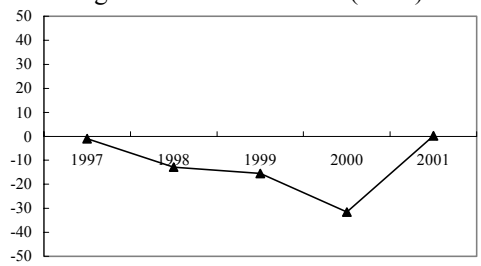
[9] Capital adequacy ratio = equity capital / gross capital (indicates procurement fund stability)

Table 4: Profit & Loss Statements for PT PLN (1997-2001) (Unit: billion Rp.)

	1997	As % of revenue	1998	As % of revenue	1999	As % of revenue	2000	As % of revenue	2001	As % of revenue
Operating income	**11,126**	**100%**	**14,036**	**100%**	**15,997**	**100%**	**22,556**	**100%**	**28,624**	**100%**
Power sales	10,877		13,766		15,670		22,139		28,275	
Other	248		269		326		416		348	
Operating expenses	**9,449**	**85%**	**16,808**	**120%**	**21,502**	**134%**	**27,215**	**121%**	**31,939**	**112%**
Power purchases	325		1,885		5,082		9,395		8,717	
Fuel expenses	4,338		9,408		9,691		10,375		14,007	
Operation and maintenance expenses	965		924		1,497		1,610		2,630	
Personnel expenses	1,068		1,018		1,335		1,802		2,086	
Depreciation allowance	2,250		3,074		3,224		3,229		3,404	
Other	501		495		670		802		1,094	
Operating profits	**1,676**	**15%**	**-2,772**	**-20%**	**-5,505**	**-34%**	**-4,659**	**-21%**	**-3,314**	**-12%**
Non-operating profit & loss	-2,255		-6,382		-5,348		-19,331		3,880	
Pre-tax profits	**-579**	**-5%**	**-9,155**	**-65%**	**-10,853**	**-68%**	**-23,990**	**-106%**	**566**	**2%**
Taxes	-		-390		-514		-620		-569	
Extraordinary profit & loss	-		-		-		-		183	
Current term profits	**-579**	**-5%**	**-9,545**	**-68%**	**-11,368**	**-71%**	**-24,611**	**-109%**	**180**	**1%**

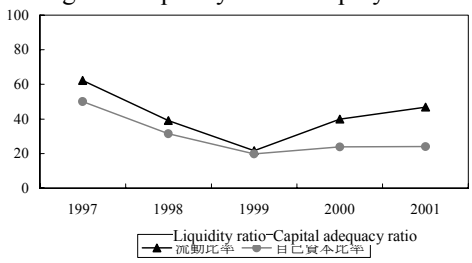
Source: PT PLN

Fig. 14: Return on Assets (ROA)



Source: PT PLN

Fig. 15: Liquidity Ratio / Equity Ratio



Source: PT PLN

2.5.2 Operation and Maintenance

There are no problems with the equipment, etc., introduced through this project at present.

2.5.3 Ability of Citizens to Pay (connection fees, electricity tariffs)

After electrification was completed via the project, residents were required to pay a connection fee averaging Rp. 765,525 per household. To prevent the high connection fees from hindering advances in the household electrification rate, in 1982 the Indonesian government began

providing funds in the form of rural electrification credit (KLP), a funding scheme[10]. Notwithstanding, results from the interviews conducted during this survey reveal that a mere 8.5% (17 people) of respondents have utilized KLP, with the majority electing to make a one-time cash payment. When asked about the connection fee, the majority of respondents felt that it was expensive with 20.0% (40 people) stating that it was "very expensive" and 34.0% (68 people) that it was "expensive" (see Figure 12).

Case Study 2: Operation and Maintenance Management in Muara Telang district, Banyu Asin Regency

Muara Telang district can be reached by speed boat from Palembang the capital city of South Sumatra Province within approximately two hours. A small diesel generator plant has been installed in Telang Jaya village, a village in the district, and it supplies electricity to eleven villages in Muara Telang (off-grid electrification).

These villages were electrified in 1997 using the two 220kW diesel generators procured through this project. One 100kW generator was subsequently provided in 2000, and in 2002 a 500kW generator was additionally procured, thus this independent grid currently has an installed capacity of 1,040kW. Power is supplied between 6 p.m. and 6 a.m. the following morning (12 hours), and peak load, which occurs between 7 and 9 p.m., is in the region of 540kW. One of the generators procured through this project is used to support the demand-supply balance during peak hours, while the other exists as a standby. PLN is aiming to connect the district to the Palembang grid in 2005, and if this happens then the diesel generators will be used to supply power to other regions.

A small diesel generator

Tariff collection point

The small diesel generator plant is supervised by PLN, and operation and maintenance work is outsourced to the local KUD (Listrik Mariana). The work is commissioned under an MSA-style contract, with four members of the KUD performing operation and maintenance work on the small diesel generators and the independent grid system, reading meters, collecting tariffs, and installing the wiring for household connections.

The current issue is the fact that the number of households awaiting connections has now reached approximately 1,000. Given that this is almost the same as the number of households that have been electrified, the figure cannot be ignored. The low capacity of the transformer is responsible for the bottleneck.

Meanwhile, electricity tariffs vary according to the contracted supply load, however, in the villages electrified via this project, the majority of residents have low-capacity household

[10] The payback period for credit is either 12 or 24 months (with a 3-month deferment period). As of the end of 2001, credit had been extended to 780,779 people (446,789 of whom live on outer islands).

(450VA or 900VA) contracts with PLN and, under government regulation, and tariffs are being kept at very low levels. Consumers pay a fixed tariff (base charge) of Rp. 9,500 per month for a 450VA supply contract plus additional charges for power used. According to interview results, 64.8% (129 people) pay less than Rp. 50,000 a month (Rp. 58,810 on average).

With respect to the electricity tariffs, 25.5% (51 people) of respondents felt that they were "very expensive" and 28.0% (56 people) that they were "expensive", whilst 38.0% (76 people) felt that they were "fair" (see Figure 13)[11]. However, prior to electrification many households used considerable amounts of pricy kerosene for lighting, with 47.2% (94 people) of respondents stating that they spent at least Rp. 30,000 a month (approx. Rp. 1,500/liter). Furthermore, amidst rapid price increases in the wake of the 1997 economic crisis, the increases in electricity tariffs have been lower than inflation[12], and are lower than current market prices. Bearing this in mind, the current tariffs are considered to be competitive, even when compared with the alternative (kerosene).

Fig. 12: Perception of Connection Charges

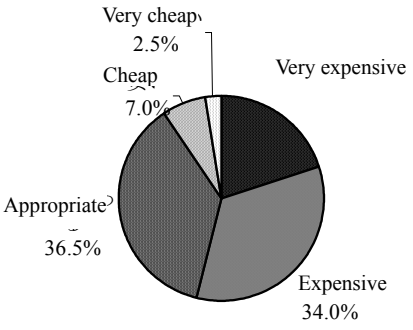
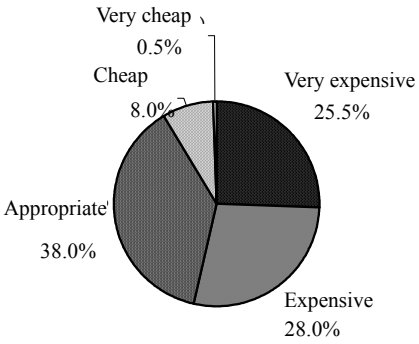


Fig. 13: Perception of Power Tariffs



3. Feedback

3.1 Lessons Learned

Nothing

3.2 Recommendations

[To the executing agency and local governments] The beneficiaries, local governments and

[11] Tariff collection performance is generally favorable. According to the KUD member responsible for collecting tariffs in Kesik village, Punik Agung – one of the villages visited during this survey – of the 325 houses with PLN contracts, only 15 had failed to pay up by the July 2003 deadline. This was primarily because there was only an 8-day gap between distribution of invoices and the payment deadline and in many cases the bills have been paid in spite of the delay.

[12] According to International Financial Statistics (IFS), Indonesia's consumer price index (CPI) increased 2.7 times between 1996 and 2002. By contrast, the electricity tariffs charged by PLN rose from 165.43Rp/kWh in 1996 to 334.55Rp/kWh in 2001, an approximately twofold increase.

PLN need to find appropriate measures of sharing the cost burden. For the beneficiaries, it is necessary to adopt appropriate price settings (increasing tariffs) with due consideration given to poor households.

This project contributed to improvements in both socio-economic conditions and living standards in the regions through the electrification of villages outside the Java-Bali grid, and has contributed to an easing of inter-regional gaps. However, as stated above, full cost recovery is difficult. By contrast, electricity tariffs (particularly for low-capacity household contracts) are at lower level even when compared with pre-1997 levels, and the potential for increase of tariff exists, even when coupled with the objective of supporting regional development. For PLN to overcome its financial difficulties, efforts must be made to find an appropriate way of spreading the cost burden among the beneficiaries, local governments and PLN. However, while the price increases are being considered, it is hoped that efforts will be made to reduce the connection fees and relax payment terms, particularly for the poor and for low income households, whilst giving due consideration to ability to pay.

Comparison of Original & Actual Scope

Item	Planned	Actual
(1) Outputs Villages targeted (outside Java-Bali grid) 1. Construction of distribution line (1) MV distribution lines (20kV) (2) LV distribution lines (380V, 220V) (3) Transformers (20kV/380V, 220V) 2. Installation of small diesel generators	 670 villages 2,963km 2,057km 44,200kVA 77	 New: 711 villages Upgraded: 206 villages 3,033km 2,734km 35,358kVA 113
2. Project period 1. L/A signing 2. Procurement of equipment 3. Manufacture & installation of equipment 4. Construction procurement procedures 5. Execution of electrification work	 Oct. 1996 Jan. 1997 – Aug. 1997 Jun. 1997 – Nov. 1997 Jul. 1997 – Feb. 1998 Oct. 1997 – Oct. 1998	 Dec. 1996 Jan. 1997 – Dec. 1999 May 1997 – Jan. 2000 Mar. 1997 - Nov. 1999 Nov. 1997 – Dec. 1999
(3) Project costs Foreign currency Local currency Total ODA loan portion Exchange rate	 0 million yen 8,153 million yen (177,233 million rupiah) 8,153 million yen 6,115 million yen 1Rp = 0.046 yen (as of November 1996)	 0 million yen 6,554 million yen (312,095 million rupiah) 6,554 million yen 4,897 million yen 1 Rp = 0.021 yen (weighted average for execution period)

Third Party Evaluator's Opinion on
Rural Electrification Project (2)

Erna Witoelar
Chair, KEHATI Foundation

Relevance

There is no doubt that rural electrification will reduce poverty, improve health and education of the beneficiaries and their families, and can reduce the rate of urbanization. The project has also proven this through the impact survey conducted by the project, which has shown the relevance of this project at time of implementation until now and in the future. Nevertheless, poverty is still so large in actual figures[1], despite Indonesia's commitment and ability to reduce poverty in percentage at the national level. Significant disparities (between regions, also between urban and rural areas[2]) still and will continue to exist for some time. Poverty eradication is the main priority of the Indonesian national development program (*Propenas)*, and will remain a priority of the new government under president Yudhoyono. Hence, provision of infrastructure for the poor will continue to play a vital role in enabling the poor to conduct economic activities, to get themselves out of poverty and to increase their access to basic social services.

With the decentralization of Indonesia launched in the year 2000, poverty eradication has also become the local governments' priority, as stipulated in law no 25/2000. Local governments with sound poverty reduction strategies received special central government extra allocation of funds (*Dana Alokasi Khusus*). Appropriate poverty reduction strategy will also increase the district's or city's eligibility to receive direct foreign grants or very soft loans. With the MDGs increasingly becoming the overarching goals of almost all multi- & bilateral donors, infrastructure for the poor on a cost-sharing basis has also become more and more eligible for development grants.

Efficiency

The project planned to finish in 24 months, but actually it took 37 months, with the increase of Rp. project cost yet a decrease in yen cost. Since it had increased significantly it's coverage of villages, transmission lines and small diesel generators, this project can be seen as efficient for it's time and condition of implementation. Yet the efficiency of similar projects in the future can be better, with present decentralized situation and increased opportunities mentioned previously.

First, in planning and implementation: in is not enough to give priority to on-grid installations anymore, as most severe poverty exist mainly in remote and isolated areas, which need more off-grid systems. Hence more effort is needed to combine installations on higher and lower economic efficiency within one district to enable a cross-subsidy or multi-financing system. Decentralizing project leadership to district level will also allow a more holistic and efficient planning with other poverty alleviation infrastructure projects (rural roads, clean water, fishing boat ports, etc).

Second, in the financing system: it is not appropriate anymore to calculate it solely on economic efficiency. It should be combining JBIC loans for the larger socio-economic potential areas, with poverty alleviation budgets from central/district governments or grants from JICA/other bilateral donors for poorer villages still low in economic potential, both within the same district. This "affirmative action" is necessary for just an agreed limited time until the villages have improve their economic potential to be able to increase their individual and communal ability to pay.

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[1] According to the Indonesian MDGs (Millennium Development Goals) Report, 2004, in the year 2002 approx. 10,3% of the population or 21,8 million people live in extreme poverty or $1 a day, but 54% or 115 million people live below the $2 a day national poverty line.

[2] Also from the Indonesian MDG Report, 2004: Jakarta has 4 % while Papua has 55% of its population living below national poverty line, and approx. 72% of all those below poverty line live in the rural area.

Third, in the O & M system, with more ownership of local governments with their cost sharing requirements, the motivation for more efficient O & M system will also increase.