



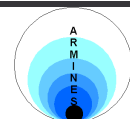
**REDEO
RURAL ELECTRIFICATION
DECENTRALIZED ENERGY OPTIONS
EC-ASEAN Energy Facility
Project Number 24**



REPORT FOR ACTIVITY 5

RURAL ELECTRIFICATION PLANNING FRAMEWORKS IN INDONESIA

OCTOBER 2004



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Objective

To assess the existing/future structure and regulatory framework of electricity sector in Indonesia and opportunities of private sector involvement in the rural energy development

Rural Electrification

Status of Rural Electrification

In Indonesia there are 66,215 villages. Out of 66,215 villages, there are 52,000 villages already electrified (DGEEU, 2003). Out of 52,000 villages, 28,595 villages are in outer islands and the rests are in Java Island. This condition shows that the rural electrification in Java is qualitatively better than in outer islands. The increase of electrified villages is very significant because in December 2000 total village electrified is just 49,155 villages (www.djlpe.go.id, 9/8/04).

Electrified village parameter might lead to wrong conclusion because there is possibility that not all households in the village have access to electricity. The government should use other parameter such as rural households electrified.

The quality of service in each area is also different. In the areas which have grid extension the communities will have 24 hours service. Areas which have decentralised system (other than micro-hydropower) in most cases only have electricity service in the peak hours. This parameter might also be introduced to study the quality of electrification.

The rural electricity supply solution for each village might be different. Some villages are electrified by PLN's extended grid and some villages are electrified by decentralised standalone mini grids. The archipelagic nature of Indonesia has forced the government to use two different strategies for rural electrification. The first is extending the grid and the second is providing decentralised power system such as Solar Home System (SHS) or micro-hydropower plants (MHP).

Electricity Tariff for Rural Households

The connection rate of PLN for both rural and urban households is the same; it depends on the connection class. Rural households usually have 450VA connection although some of them are using 900VA connection. The 450VA connection is called "social electricity" because it is still heavily subsidised by the government. The subsidy for connection rate and connection fee is progressive, the bigger the connection class the less the subsidy. The connection rate and connection fee for 450VA connection and 900VA connection is as follows.

Table 1 Electricity Tariff 2004

	Connection	per kVA			per kWh
R1/TR	up to 450 VA	Rp11.000	Block I	up to 30 kWh	Rp 169
			Block II	30 kWh-60 kWh	Rp 360
			Block III	more than 60 kWh	Rp 495
R1/TR	900 VA	Rp20.000	Block I	up to 30 kWh	Rp 275
			Block II	30 kWh-60 kWh	Rp 445
			Block III	more than 60 kWh	Rp 495

Source: <http://www.djlpe.go.id/Link%20Kiri/kp104'03lamp.htm>, 9/8/04

For household connection there is no difference between peak tariff and off-peak tariff. This kind of tariff is only applied to commercial/business customers that have connection above 200 kVA.

In some cases such as in Lombok Island, the electricity connection rate is even bigger than PLN's. In Lombok Island, where Koperasi Listrik Perdesaan (KLP, Rural Electricity Co-operative) Sinar Rinjani operates, the connection rate can reach 900 IDR/kWh. The connection fee for 450VA connection is 3 folds than PLN's connection fee. This shows that the need to have electricity as the symbol of modernism is very high and people are willing to pay expensive for electricity.

Table 2 KLP Sinar Rinjani Electricity Tariff 2003

	Connection	Fee			per kWh	Fuel Comp	Total/kWh
R1/TR	up to 450 VA	Rp 9.000	Block I	up to 20 kWh	Rp 600	Rp 300	Rp 900
			Block II	20 kWh-60 kWh	Rp 625	Rp 300	Rp 925
			Block III	more than 60 kWh	Rp 650	Rp 300	Rp 950
R1/TR	900 VA	Rp13.500	Block I	up to 20 kWh	Rp 600	Rp 300	Rp 900
			Block II	20 kWh-60 kWh	Rp 625	Rp 300	Rp 925
			Block III	more than 60 kWh	Rp 650	Rp 300	Rp 950

Source: KLP Sinar Rinjani, 2003

The purchasing power of rural communities is more important than the tariff because the subsidies might go to the wrong target group. It is analysed that subsidy usually goes to the rural rich which has the capability to pay the initial connection fee (Mendis *et. al.*, 1995). This condition will jeopardise the poverty alleviation objective of rural electrification.

Electricity tariff will certainly be increased in the future. The increase will likely use step-by-step approach. This approach means in one year the tariff will be increased several times at smaller rate until the final rate reaches the intended number. The increase of electricity tariff is very political. Basically the people does not like if the government has to increase the tariff. Tariff increasing is a very difficult decision for the government and also the legislative. But eventually people have to learn how to use energy more efficient and conservative.

Increasing electricity tariff would also indirectly create market for renewable energy because the power purchase contract will be paid at higher rate. Recent electricity tariff can be found in the annex.

Market for rural electrification

There are still more than 14,000 villages un-electrified throughout Indonesia. This number is big considering the financial investment it needs. DGEEU has the target to electrify 8,847 villages in year 2003-2010 (Sumiarso, 2003). Out of 8847 villages 8,375 villages are in the outer islands. The investment needed for the 7 years programme is projected to be US\$ 6,230 million for both extending the grid and providing new power plants (Sumiarso, 2003).

The investment needed in outer islands is more than US\$ 4,200 million. This number might become bigger if considering the population density is very low compared to Java Island. The solution might be focused in providing new power systems including the grid. Decentralised solutions such as micro-hydro plants or SHS are also in sight although it depends on the locally available renewable resources.

Focusing on renewable energy especially hydropower, Indonesia is endowed with a large amount of untapped hydropower potential. Theoretically the potential is 75,000 MW and out of that number 34,000 MW was economically feasible (Meier, 2001). For the purpose of rural electrification mini-hydropower plant can be utilised. Using plant capacity of 1 MW, the potential for mini-hydropower is 500 MW (Meier, 2001). This means at least 2 mini-hydropower plants should be constructed in order to increase the mini-hydro capacity to 60-160 MW in 2020 (ACE, 2000). Using the specific investment cost of US\$ 1,500/kW then at least US\$ 3 million should be invested each year.

The rural electrification market is theoretically big, but that is only from the government point of view which inherent public service objective. Private sector who wants to invest on the generation for rural electrification should study carefully:

1. The grid. Whether it is connected to national grid or not
2. Purchasing power of targeted rural community (affecting demand). If it is an off-grid project then this parameter should be carefully analysed.

The existence of grid will ensure continual income from power selling. The off-grid system will have the challenge to survive if the purchasing power of the people is low. A holistic approach of energy provision in rural areas should be applied. The objective should be broadened to develop economic capacity of the people through electricity.

Market of renewable energy for rural electrification in Indonesia is actually not really developed. First reason is the financing; there is no commercial financing. Financing heavily relies on the government and foreign aid (which are limited). The government it self does not have open

tangible targets especially for renewable energy. No target means there is no market; market is driven by demand and the demand is set by the target. Role of the government to shape the market is very big. It is possible that the government (DGEEU) does not realise the importance of this role.

Micro/Mini Hydropower for Rural Electrification

Rural electrification in Indonesia is relying on grid extension or installation of new diesel power plants. Where there is no grid extension, PLN implement mini grid and utilising diesel power plants. Renewable energy system such as mini hydro (more than 500 kW) will be installed if there is already grid extending to the villages. For remote villages, decentralised systems are the choice. Systems such as Solar Home System, Wind Power Generator, or Micro Hydro are the system usually installed.

For micro and mini hydropower plants, according to data from GTZ-MHPP there are at least 168 MHP plants with total capacity more than 45 MW. The owners of those power plants are PLN, Regional Government, Department of Public Works and local community. PLN it self already studied some potential sites. Those sites are still in the detail design phase or feasibility study phase. There are 86 sites identified and the potential power generation can reach 137 MW. The complete list is in the Annex.

The Ministerial Decree 064K/40/MPE/1998 about Rural Pre-Electrification is endorsing the utilisation of hydropower technology in rural electrification projects. This decree shows the support from the government for hydropower although the support is limited only to hydropower plant up to 200 kW.

Rural electrification programme

General Rural Electrification Policy

The general policy of rural electrification has the objective to increase the welfare of rural communities. This general policy actually allows overlap of rural electrification implementation. The decision on what strategy should be implemented is based on geographical condition. Areas that are fairly close to national grid will be electrified by extending the grid while areas that are remote and far from the national grid will use independent electrification solution.

The technology choice will be different if the rural area is significantly remote. PLN mainly install diesel generator sets to those remote areas. Ministry of Cooperative (MOC) usually supports the installation of micro-hydropower. The regional governments usually prefer micro-hydropower or PV. The Ministerial Decree no. 064.K/40/M.PE/1998 concerning the rural pre-electrification program utilizing photovoltaic and micro hydropower sets up the path for choice of decentralised systems. In the case where the community is big and dense enough PLN could promote the installation of mini grid.

The implementation of MD 064 is quite well especially for PV. From the information of PT. Gerbang Multindo Nusantara, annually at least 500 sets of PV are installed all over Indonesia. 500 sets represent 25,000 watts or 25 kW. Most of the PV projects come from district level governments. PT. Gerbang Multindo Nusantara is not the only player in PV supplies, so the PV markets will certainly more than 50 kW per year.

The evolution of Key Players

Rural electrification programme in Indonesia is evolving especially concerning the key players. In the era before Law 20 2002, PLN is the key player of rural electrification. The government gave the task to electrify rural areas to PLN. PLN did the task very fine by extending the national grid or creating mini grids with decentralised power systems. PLN even had a division named Rural Division (Divisi Perdesaan/Divdes) that was specially implementing the rural electrification programme. PLN created big part of rural electrification programme in Indonesia.

Beside PLN, some government institutions were also implementing rural electrification programmes. Those government institutions for example were Directorate General of Electricity and Energy Utilisation (DGEEU), Department of Cooperative and Small/Medium Enterprises Development (MOC), Agency of Assessment and Application of Technology (BPPT) and also

Regional Governments. Those government institutions usually implemented decentralised power systems for their rural electrification programmes.

MOC is an important counterpart of PLN in the rural electrification programme. One of the important rural electrification implementation is Electricity Co-operative. The co-operation between MOC and co-operative is based on the Joint Decision between Ministry of Mining and Energy and Ministry of Co-operative and Trade No. 775/kpts/m/pertamben/1979, No 613/kpb/X/1979, 9 October 1979 about Development of Electricity Co-operative and Kerosene Distribution.

There are 4 patterns of co-operative involvement; pattern 1 until pattern 4. The simplest is pattern-1 in which the co-operative has the responsibility to read the PLN's meter, collecting the bill, do network maintenance, and troubleshoot minor troubles. The most complex pattern is pattern 4 in which the co-operative manages vertically integrated electricity business. The support from MOC is still an important component of rural electrification now.

Supports from energy related NGO and also International Development Institution such as World Bank, ADB, USAID, JICA, GTZ etc. were also big for the success of rural electrification programme in Indonesia. Since early 80s international institutions were already starting working in Indonesia in rural electrification projects for example GTZ (Meier, 2001).

After the launching of Law 20 2002, PLN became totally profit oriented company. This condition significantly affects the rural electrification efforts in Indonesia. PLN has already liquidated its Divdes Division which was responsible for the implementation of rural electrification. Beside that DGEEU also does not implement rural electrification projects directly as before because of its new role and limited budget.

MOC is still playing important role in rural electrification. Some projects, mainly supported by Japan, to install small decentralised systems were successfully implemented. The involvement of co-operative in the rural electrification such as by KLP Sinar Rinjani in Lombok is still there despite many managerial problems.

The new Electricity Law, especially article 7, says that the central and regional government are responsible for the electrification of remote rural areas, underdeveloped areas, and underprivileged groups. This means the role of regional government is bigger than before.

Central government now gives certain budget called "decentralisation budget" through the National Income and Expenditure Budget (APBN) mechanism. This decentralisation budget will touch many sectors and one of them is the general mining and energy development sector. This decentralisation budget will be able to help the regional governments to implement rural electrification in their areas (especially underdeveloped areas). Each province will get equal amount of money but the percentage that is intended for energy development is left to the decision of the regional government (DGEEU, 2004).

PLN, although formally is reducing its rural electrification activities, still play important role in rural electrification. The difference between the new programme and the earlier one is the source of money. The new programme uses the money from APBN while the earlier rural electrification programme used PLN's budget (APLN). PLN in this new rural electrification programme acts as the technical counterpart while the manager of the programme is under the MEMR (DGEEU as the formal agent). The programme is mainly aiming to extend grid and install diesel generator sets in rural areas.

Other local or international institutions still play important role in rural electrification programme. Special programme funded by ADB for example has developed an integrated rural electrification concept called PWS (Power Welfare Scheme). Using some kind of revolving fund, the rural areas that need electricity can propose a project to a steering committee. The steering committee is chaired by DGEEU. The proposal should incorporate productive end-use which will ensure the sustainability of the project. There are some pilot projects in eastern Indonesia especially in the province of Gorontalo.

PWS (Power Welfare Scheme), ADB TA No. 4054-INO

PWS is a backup project that supports the renewable energy development sector project. ADB has provided loan to GoI for the project. The objective of PWS is promoting rural development through electrification programme. This includes facilitation access to and utilisation of electricity from locally available renewable resources by low-income households in the outer islands.

The aims of the Technical Assistance are:

1. Build awareness amongst the rural low-income of the different ways of use of electricity and the benefits of productive use
2. Facilitate to organise the households into self help groups to develop community participation and involvement in accessing and using electricity for households and productive
3. Provide assistance to the groups in setting up economic activities, training, technology transfer, and marketing assistance; whenever required
4. Aid in setting up separate revolving funds for the different community groups in different locations
5. Help, as may be required, in capacity building of the community organisations to manage and run their activities

Recently there is also a Technical Assistance from ADB looking at the development of local grids. The project is aiming to reduce poverty in certain areas (mainly South Sulawesi) by increasing access to electricity. The components of the project are grid extension, implementation of hydropower plant in South Sulawesi, preparing new hydropower schemes, and project consulting. This project target group of this project is rural communities. PLN will be the implementing agency while DGEEU will be the executing agency (ADB, 2004).

The Local Grids Development project shows close relationship between project's objectives and also the rural electrification policy of GoI. The policy supports grid extension strategy and also the development of renewable energy systems for rural electrification.

Local Grids Development Project, ADB TA No. INO 36556

The TA will help GoI prepare project that will increase the quantity and quality of rural electricity supply, thus assuring greater economic activities in rural regions, reducing poverty, and providing better quality of life. The TA will provide the outputs that will help in seeking financing from ADB. On-the-job training will be conducted during implementation of the TA to ensure technology transfer and strengthening of PLN and DGEEU.

The TA will prepare the Local Grids Development Project for rural electrification with the following components:

1. Expanding the power distribution network (20 kV and 380 V)
2. Implementing mini hydropower plants in South Sulawesi
3. Preparing new mini hydropower schemes
4. Project implementation consulting services.

World Bank also actually implements rural electrification indirectly. Right now there is a programme called PPK (Program Pengembangan Kecamatan/Sub-District Development Programme). The programme is supported by World Bank and has an objective to improve the infrastructure of Kecamatan/Sub-Districts. One of many infrastructure improvements is improvement of electricity infrastructure. Many villages that are not yet electrified can have electricity infrastructure. Electricity infrastructures installed are usually micro hydropower plants (source: Hayton, Mark).

Barriers to Successful Rural Electrification Programme

- Financing rural electrification is the main barrier. The financial condition of the government and also PLN is not in a position to spend generous money on rural electrification projects. Although the Electricity Law stipulated that rural electrification is the obligation of the government, but if financial condition does not allow doing that then it will not happen. The role of private sector should be bigger in the financing of rural electrification, but private sector (especially banks) still sees rural electrification as "charity" type project. The government, with all the financial limitation, should be able to mobilise the available resources to support private sector in the rural electrification projects
- Low energy absorption in rural areas has made medium scale private investment not feasible. Low energy consumption and typical household load has made the available power plants have low plant factor. Low plant factor means also higher energy price because not all available generation potential are utilised and the fix cost to operate the power plant remains the same. Low energy consumption also lengthens the pay back period of power

plant investment. This condition is not favourable to energy investor, therefore it is important to increase energy consumption in rural areas especially for productive activities. The condition will create multiple effects such as: better community welfare and better investment atmosphere

- Scattered rural communities. In the outer islands it is often that there are remote scattered rural communities. These communities have the same right for electrification but their remoteness and scattered nature have created logistic problems that will finally affect the sustainability of the projects
- Top down approach of the current rural electrification projects. Rural electrification projects, especially related to renewable energy, are usually implemented using top down approach. Top down approach means there is very little involvement from the local community in the project, so the project looks like a gift and the community has little responsibility to keep the gift in good shape. Many communities, even the remote ones, are accustomed to top down approach. They are always asking for government's help although the help might not be the best solution for their problems. Many NGOs have started to work with bottom up approach, and they found that it is very hard to change the top down culture of the people. Some have succeeded implementing bottom up approach but it is also not little who fails. The government usually does not have the patient to implement bottom up approach due to the strict budget year. If a project has to be finished this year, then it should be finished this year. Flexible planning method should be applied, but then it will also relate to the different governmental culture.
- Culturally the rural communities usually are agricultural (farming or fishing). They work as farmers or fishers that generally have little technical knowledge needed to maintain the systems. Little technical culture and knowledge can result in the abuse of the available resources. Conditions such as overloading, by passing, and non-regular maintenance have resulted in the short life of available systems (both fossil based and renewable based). This condition creates un-sustainability of the project and the final objective of rural electrification project will be jeopardised. Bottom up approaches and slower approaches to those communities are needed.
- The other barrier is after sales service or logistical problem. Certain technology such as Solar Home System has certain component that is not always available even in the provincial city. When there is problem with the component it will be hard for the customer to get full and quick support. This condition might be less serious for other technology such as diesel generators and micro hydropower but still it is also a problem.

Evolution of the Power Industry: Organisation

Overview of the Power Industry

The power industry in Indonesia in the past 20-30 years or more was reflecting the conventional power industry. The government via State Electricity Company (PLN) had all the rights and power to develop the industry. It was a centralistic system and all the decisions were taken in Jakarta. The system was also reflecting the centralistic government at that time.

The power industry also showed the same symptoms of developing country's power industry such as significant power loss, inefficiencies, many captive power producers and also unbalanced power distribution between main islands and other islands.

The industry was quite changing in the last 10 years when the private sector was involved in the power generation. With a huge power demand and high growth rate PLN could not catch up with adequate investments. Private sector (IPP) was called in to provide necessary infrastructure to meet the demand.

	Public		Own Use
PLN	Generation	IPP	Captive Power Producers
	Transmission		
	Distribution		

Figure 1 The old structure of electricity industry

The role of the central government was very big in the old structure. The regional government played very small role and usually limited only to rural electrification.

The monetary crisis hit PLN very hard and made PLN has to renegotiate the PPA contracts with those IPPs. The monetary crisis was so hard, making PLN nearly bankrupt. This was when the government with the endorsement of IMF starting to restructure the power industry and renegotiate the PPA contracts.

The restructuring is basically making the industry to be more decentralised and competitive. By making it decentralised and competitive it is argued that there will be better efficiency in the system and the electricity price will be cheaper thus increasing the welfare of the nation.

The momentum of restructuring also made the government further preparing the legal foundation by replacing older electricity law (Law No.15/1985) with the new electricity law (Law No.20/2002). The commitment to make the industry to be more competitive is reflected by the new law.

There will be 2 areas for the industry; the competitive area and non-competitive/not yet competitive area. The organisation of power industry in both areas is significantly different. In the competitive area the competed sectors are generation and distribution. The market mechanism will work under the supervision of a market supervisory board (BAPPETAL) that should supervise, regulate, control, and monitor the market closely.

	Public		Own Use
Market Supervisory Board	Generation Companies	Generation	Captive Power Producers
	Transmission Companies	Transmission	
	Distribution Companies	Distribution	

Figure 2 Structure of the industry in competitive area

In the non-competitive or not yet competitive area, the regional government and also local PLN (former Wilayah) will have more responsibilities to develop the power sector. Beside that private

sector, local government's enterprise and also co-operative will have the chance to provide electricity to the community.

Public		Own Use
Generation	IPP/PLN/Local Companies	Captive Power Producers
Transmission	PLN	
Distribution	PLN/Local Companies/Local Government	

Figure 3 Structure of the industry in non-competitive area

The role of the government is also changing. MEMR that was the owner and also the regulator of electricity infrastructure is no longer becoming the owner of PLN. MEMR function is limited to regulator and standardisation. The role of regional government is bigger. The momentum of Autonomy Law and New Electricity Law give regional government more space to plan and invest in the electricity sector, especially for rural electrification.

Development of Power Sector

Table 3 The development of installed capacity both PLN and Private (MW)

	1995	1996	1997	1998	1999	2000	2001	2002
PLN								
Steam	4821	5021	6771	6771	6771	6771	6900	6900
Diesel	2265	2449	2416	2535	2650	2550	2585	2588
Gas	1002	1033	1371	1347	1516	1203	1225	1225
Combined	4414	5053	5589	6561	6282	6863	6863	6863
Hydro	2178	2184	2436	3007	3014	3015	3016	2942
Geothermal	305	309	363	360	360	360	360	380
Private								
Steam				1200	2400	2400	2400	2400
Gas			60	60	60	60	60	60
Combined		150	150	285	285	285	285	285
Geothermal			165	165	165	345	345	405
Total	14985	16199	19321	22291	23503	23852	24039	24048

Source: <http://www.djlpe.go.id>, 20/8/04

Overview of Sulsera System (South and South East Sulawesi System)

PLN Wilayah Sulsera manages the PLN services in two provinces: South Sulawesi and South East Sulawesi. There are six branches of PLN Sulsera: Pinrang Branch, Palopo Branch, Makassar Branch, Bulukumba Branch, Watampone Branch, and Pare-Pare Branch. Focus on PLN Sulsera is given because the proposed MHP sites for the implementation of IFRERA project are in South East Sulawesi. The four MHP sites are: Rongi, Mikuasi, Sambilambo, and Rante Limbong.

According to information from DGEEU in South East Sulawesi there are 662 villages which 526 villages are already electrified (status: December 2000, source: http://www.djlpe.go.id/Link%20Kiri/frame_informasi_listrik_18.htm). This means almost 80% of the villages are electrified. The number of households electrified in December 2000 is 77,768 households. From the same statistics, the number of villages electrified in South Sulawesi is 1,638 villages or 626,037 households. The electrification ratio is 90.85%. Still more or less 9% of villages are not electrified (165 villages left un-electrified). The number for South Sulawesi is very impressive.

Load profile in the system does not vary very much in a week. This shows that the demand is mostly come from households. Peak time exists at about 6 p.m. to 11 p.m. and the rest of the day the load is very low. Total generation capacity is more or less 420 MW with peak load more or less is 350 MW.

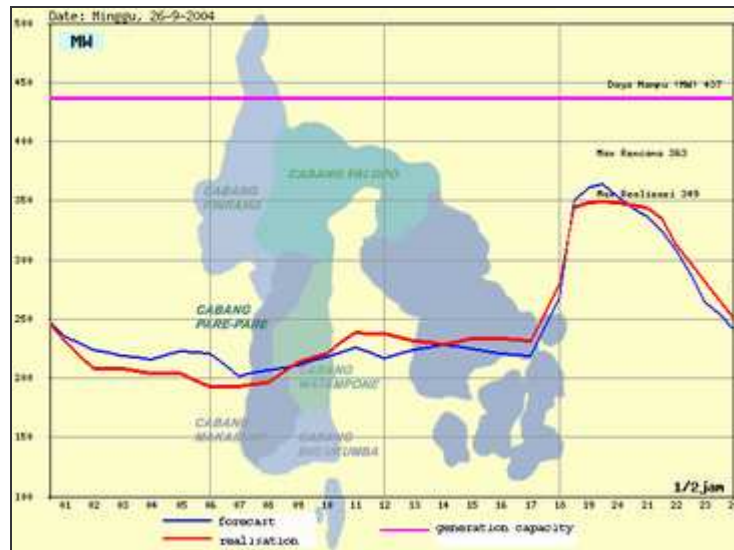


Figure 4 Load profile, Sunday 26/9/04, Sulsera System

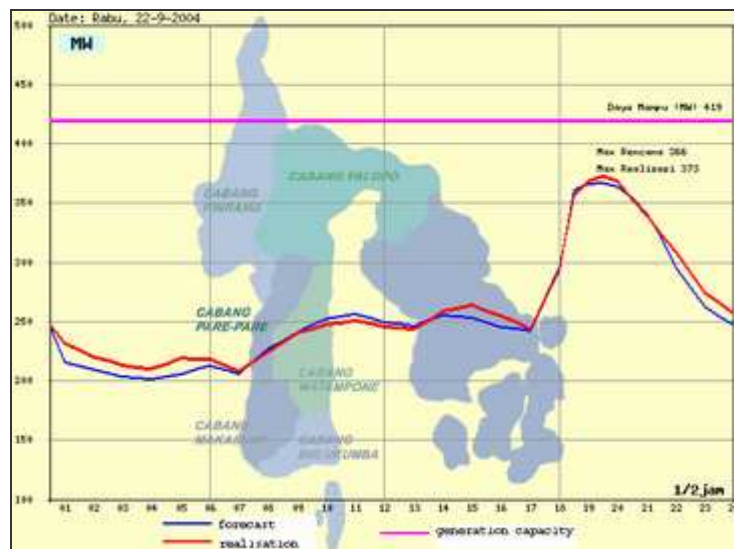


Figure 5 Load profile, Wednesday 22/9/04, Sulsera System

The generation mix of Sulsera System is planned to rely of fossil fuel. This is very contradictive with the fact that the area is blessed with abundant water resources:

Table 4 Power generation development in Sulsera System

	2003	2004	2005	2006	2007
	MW	MW	MW	MW	MW
Hydro			20		
Gas		65	30		50
Steam				120	165
Oil			4,8	6,2	
Diesel	5	7,5	10		

source: Indonesian Electric Power Business Directory 2004

Restructuring, Decentralisation, and Privatisation

Restructuring the industry was already started in 1993 with a feasibility study of the unbundling of generation, transmission and distribution systems in the industry (Pelangi, 2001). The force to restructure the industry came faster when Indonesia was struck by financial crisis. The government initiated "*The August White Paper*" in 1998 that contains a comprehensive restructuring policy of the industry.

The objectives of restructuring according to "*August White Paper*" are:

1. Improvement of financial capacity
2. Competition
3. Transparency and
4. Efficient private sectors participations.

Restructuring the industry means restructuring PLN and PLN has the commitment to restructure its organisation due to financial reasons. After the issuance of the White Paper, PLN unbundled its generation division PJB I and PJB II becoming PT. Indonesia Power and PT.PJB. PLN also started to decentralise its power to the provincial level PLN or PLN Wilayah and PLN head office will only be the holding company of its daughter companies.

According to the new Electricity Law role of regional government is very important (article 7). Regional government has the power to issue permits to generators and also related permits for the business in the industry (such as EIA). Regional government also has the obligation to draw a general plan of electric power for the region. The regional general plan of electric power (RUKD) will be used as the based of national general plan of electric power (RUKN). The electricity business should follow RUKD or RUKN for planning.

The spirit of decentralisation is reflected by the bigger role of regional government in the electricity industry and also the bigger role of regional PLN offices and private sector. The problems with the process of decentralisation are:

1. Lack of planning capability at the level of regional governments especially in the power sector
2. PLN Head Office still partly holds the PLN Wilayah not giving the autonomy fully. All important decisions are made at the head office
3. In transition period there is lack of technical regulations regarding the implementation of power industry decentralisation.

One important commitment of industry restructuring is privatisation. The new electricity law already guarantee that privatisation is coming (article 17). Privatisation exists for both the competitive area and non-competitive area.

The level of privatisation is different for each sub-systems (generation, transmission, and distribution), and for the business area (competitive and non-competitive). The generation and distribution in the competitive area is purely competitive and the price will be negotiated according to the market power. The rest of the sub-systems will be regulated by Market Supervisory Board. In the non-competitive area the market is regulated by the central government or regional government (if there is no interconnection to national grid).

Reforms in the Different Sectors of the Power Industry

Reforming the power industry includes the reformation of several areas. Those areas are (Pelangi, 2001):

1. Unbundling and restructuring the industry
2. Introduction of competition system
3. Tariff determination
4. Cost improvement and omission of subsidy
5. Rationalisation and broadening the participation of private sector
6. Redefining the role of the government.

The unbundling of the industry mainly means unbundling PLN. The generation, transmission and distribution sub-systems will be managed by separate companies. PLN head office will be holding company of those daughter companies (PJB and IP for example).

Competition system will be introduced in Batam area first and next will be in Jamali (Jawa Madura Bali) area. The time frame of implementation is 2005 in Batam and 2007 in Jamali the latest.

Tariff determination will be different for both competitive area and non-competitive area. Tariff in the competitive area also depends on the sub-systems of the industry. The generation and distribution sub-systems will rely on market power, so the most economic price will get the contract. The tariff for the rest of sub-systems will be regulated by Market Supervisory Board (BAPPETAL). In the non-competitive area the tariff will still be regulated by the government.

Cost improvement and omission of subsidy can be achieved by the implementation of efficient power industry. This means the power industry from up stream to down stream should apply efficiency measures very strictly to hold the cost down. Holding the cost down means reducing the production cost and also reducing the tariff and eventually will reduce the subsidy. The standardisation of technical implementation is important here.

Rationalisation of private sector participation is true especially regarding the contracts of big IPPs. The contracts that use "take or pay" mechanism are considered not in the favour of PLN/the government. PLN and the government still try to renegotiate those contracts. Rationalisation is including the development of better and clearer regulations regarding private participation.

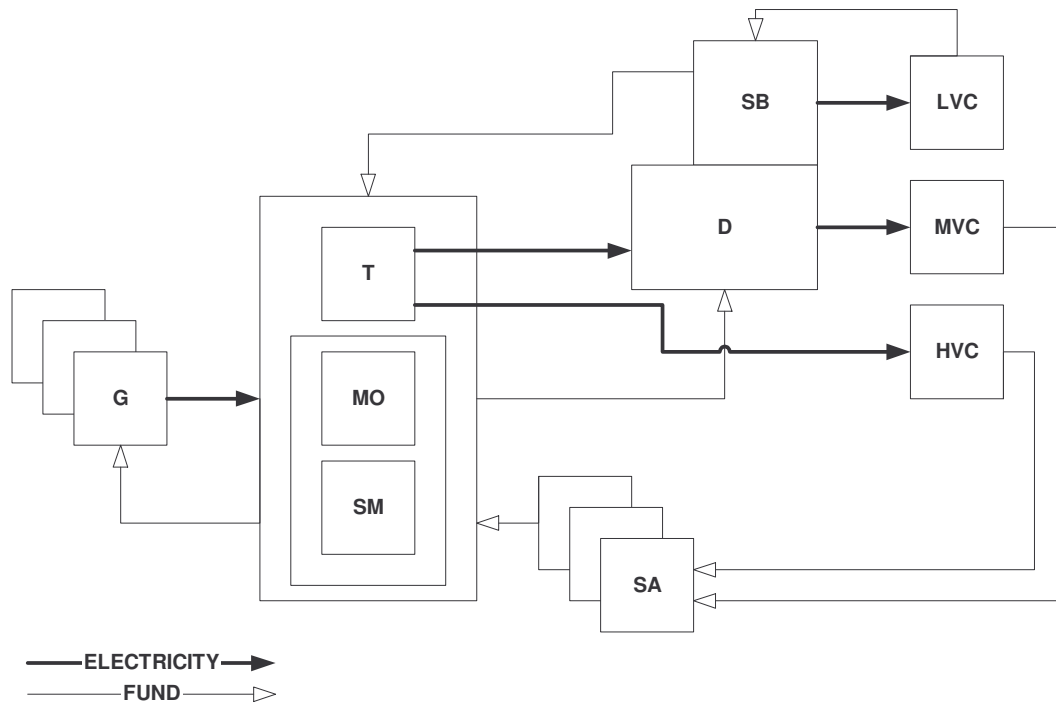
To meet the ever increasing demand the government and especially PLN still need the participation of private sector. Therefore the participation of private sector is still open very wide especially in the generation sub-system and distribution sub-system.

The role of the government is also changing. The government plays important role in the planning, regulating, and also standards setting. The provision of electricity is mainly the role of private sector or state enterprise (i.e. PLN) except for the underdeveloped areas (article 7, Law 20 2002) where the government has the obligation to do it.

New Structure of the Electricity Industry

The future structure of electricity industry is as follow.

Competition area (Batam Island and JAMALI)



Source: Blue Print of Electricity Industry, <http://www.djlpe.go.id>, 5/6/2003

Figure 6 Structure of electricity industry in competition area

Where:

- | | | | |
|-----------|------------------------------|------------|---------------------------|
| G | Generators including IPP | D | Distribution |
| T | Transmission | SA | Electricity Selling Agent |
| MO | Market Operator | LVC | Low Voltage Customer |
| SM | System Maintenance Business | MVC | Med Voltage Customer |
| SB | Electricity Selling Business | HVC | High Voltage Customer |

Non-Competition area

Generators	Transmission	Distribution
Generators		Distribution

Figure 7 Structure of electricity industry in non-competition area

The structure of non-competition area is simpler than of competition area. In the non-competition area, private sector can still play important role. Private sector is encouraged to develop the electricity infrastructure in the area and also to involve in rural electrification. Private sector can establish vertically integrated electricity business in the area. Possibility to make cooperation with local government is open wide.

Structure of PLN

PLN is the important player in the industry is also restructured the recent organisation structure is as follow.

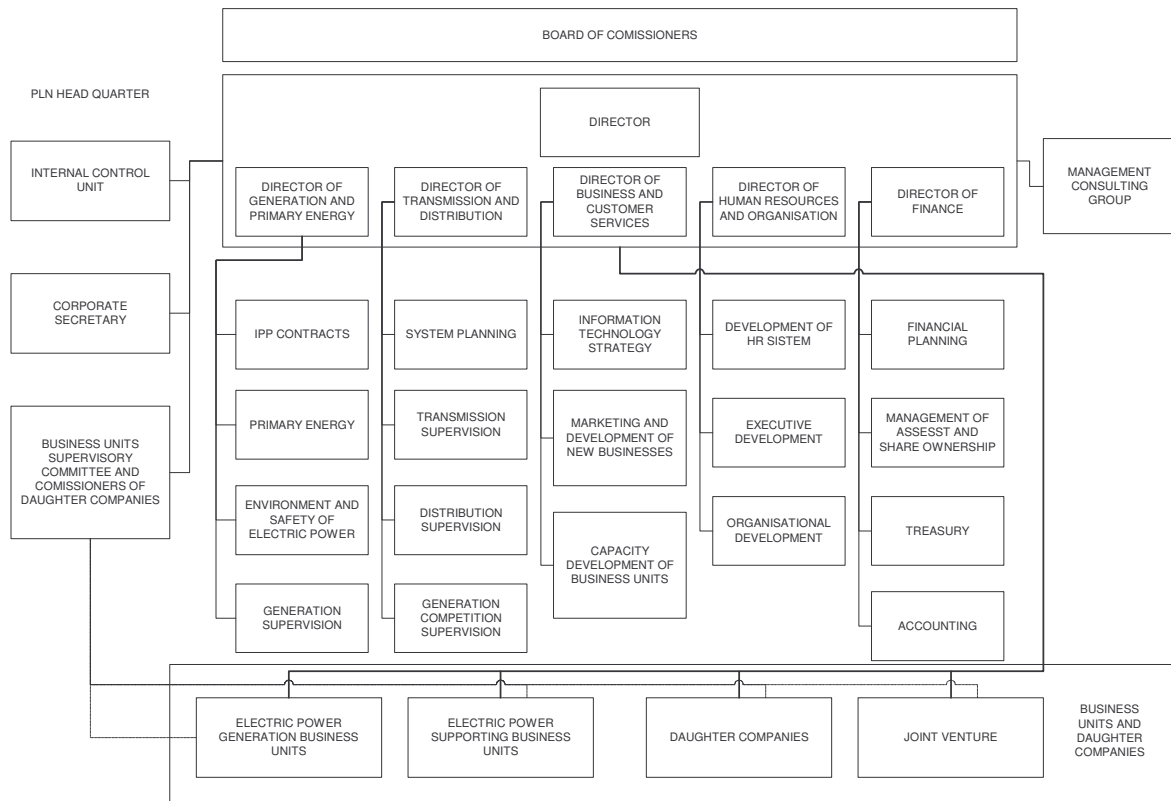


Figure 8 PLN's organisation structure (status June 2004)

The structure shows that there is no more division or sub-division that is responsible for the implementation of rural electrification. Generation and Primary Energy division is responsible for the development of renewable energy power plants of PLN and implementation of PSK Tersebar (Small IPP).

Responsibilities/Roles of various institutions of the Restructured Power Sector

With the changing of the power sector structure, the responsibilities of different actors are also changing. To understand the responsibilities/roles better, the relationship between players in the industry should be understood.

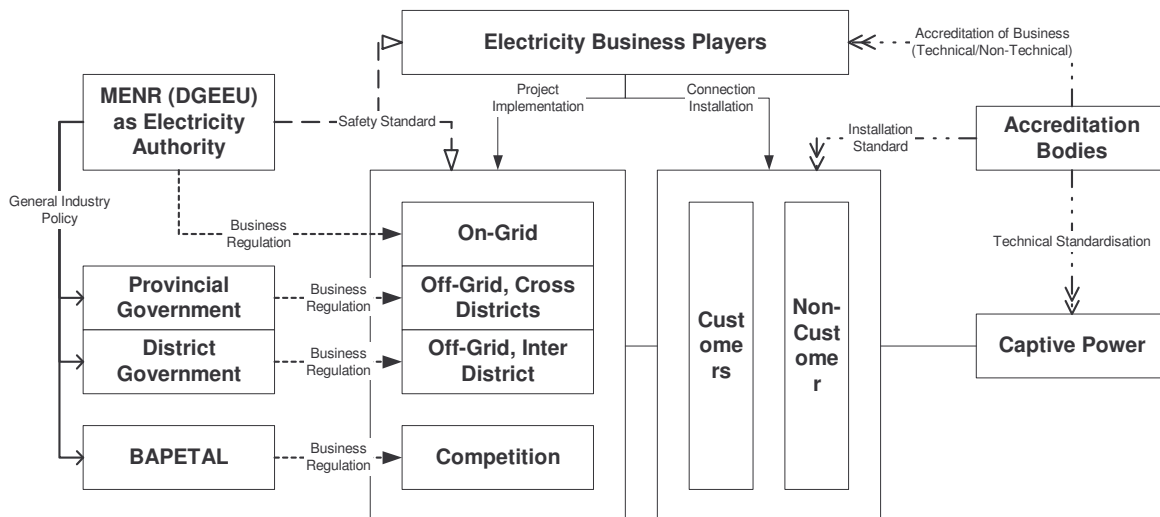


Figure 9 Relationship between key players in the restructured power industry

From the diagram above we can see that there are at least 6 key players in the restructured power sector. The roles of those players are:

MEMR (DGEEU)

The roles of DGEEU are:

1. Providing general electricity policy such as General Plan of National Electric Power (RUKN)
2. Providing Business Regulations for electrification in non-competition areas that is grid connected. The business regulations for example are: Permits, Tariff, and Customer Service Regulations
3. Providing standard in electric power especially electric power safety. This standard is valid for both the electricity infrastructure and also workplace safety
4. Issuing permits.

Provincial/District Governments

The role of provincial government is providing business regulations for electrification in non-competition areas that is off-grid and having cross districts network. The regulations include permits, tariff, and also customer service standard.

The role of district government is providing business regulations for electrification in non-competition area that is off-grid and the grid is only intra district.

Supporting roles of regional government are:

1. Providing investment approval
2. Providing EIA approval
3. Providing local formal supports for new investment etc.

BAPPETAL

The role of BAPPETAL is providing business regulations for electrification in competition areas. The regulations include permits, tariff, and customer service standards. BAPPETAL also monitor, control the electricity market. It also gives penalties for players gone bad.

Accreditation Bodies

Accreditation bodies consist of some institutions which have different roles. The important bodies are:

1. KAN (Kantor Akreditasi Nasional/National Accreditation Office)
2. LPJK (Lembaga Pengembangan Jasa Konstruksi/Agency of Construction Service Development) is responsible for accrediting Construction Service Business
3. DGEEU is responsible for accrediting Non-Construction Service

4. Professional Association is responsible to accredit the competency of a company/person. Examples are Association of Electrical Engineers, Association of Indonesian Engineers etc
5. Laboratory for testing is responsible to test products or calibrate products
6. Certification Laboratory of products is responsible to test the product whether it follows the National Standard (SNI), and also the safety factor of it
7. Certification Laboratory for electrical installation is responsible to check whether the electrical installation is in line with the standard or not
8. Consultant for national certification is responsible to help the company to achieve national standard (SNI).

Electricity Business Players

The players are consultants, generators etc. The players are responsible to provide any kind of electric power business from power generation to household installation service.

Captive Power Producers

Captive power producers are responsible to provide electric power supply to non-customers or to companies that use the power for their own purposes.

Beside those players above some other institutions also have important roles in the electricity industry. The institutions below are important for the sector but not seen in the diagram in Figure 9.

BAKOREN

BAKOREN or the National Energy Coordination Body is responsible for the general energy policy setting and coordination. BAKOREN is a ministerial level body with the chairman from MEMR.

Ministry of Cooperative and Small/Medium Enterprise (MOC)

MOC is responsible in the development and support of any co-operatives in Indonesia. Especially for the electricity co-operative the ministry has special interest because the co-operatives are supporting the rural electrification programme.

Ministry of Finance (MF)

The ministry is responsible for the development of investments in Indonesia especially regarding the tax and also tariff for new investments. The restructuring of power sector needs special financial incentives such as tax exemption or tax holiday.

Ministry of Trade and Industry (MTI)

This ministry is closely related to the electricity products that are in the market. The ministry will issue permits for companies that will produce certain electrical product and/or registering/monitoring the importation of certain electrical product. The ministry also has the authority to control products if they are inline with the National Standard (SNI) or not.

The Office of State Ministry of State Enterprises Empowerment (MSEE)

The office is responsible for the internal restructuring of PLN and promoting the decentralisation of power in the PLN's structure.

BAPPENAS (National Development Planning Body)

The role of BAPPENAS is mainly monitoring any planned programmes whether the programmes are in line with short/medium/long term objectives of the national development. All discussion of energy planning in the government level will always involve BAPPENAS.

Role of the Private Sector in Rural Energy Delivery

The role of private sector in the rural energy delivery is actually important. In remote areas where there is no PLN grid, small private entities are already supplying energy to the community. According to the national statistics the province of Bangka Belitung has the highest percentage of electrification by non-PLN source (BPS, 2002). The table is as follows.

Table 5 Percentage of households according to the source of lighting

Province	Electricity PLN	Electricity Non-PLN	Other Sources
Sumut	83,96	2,22	13,82
Sumbar	75,75	2,23	22,02
Riau	56,63	17,85	25,52
Jambi	53,51	10,12	36,37
Sumsel	59,17	4,89	35,94
Bengkulu	61,86	3,17	34,97
Lampung	47,08	6,67	46,25
Babel	64,36	21,37	14,27
Jakarta	99,65	0,31	0,04
Jabar	95,46	0,49	4,05
Jateng	95,91	0,44	3,65
Jatim	97,55	0,03	2,42
Yogya	94,83	1,11	4,06
Banten	90,19	0,22	9,59
Bali	97,02	0,01	2,97
NTT	75,51	3,36	21,13
NTB	33,76	3,21	63,03
Kalbar	63,3	3,79	32,91
Kalteng	56,38	7,27	36,35
Kalsel	80,9	2,64	16,46
Kaltim	80,65	8,01	11,34
Sulut	89,55	0,5	9,95
Sulteng	53,91	6,93	39,16
Sulsel	73,57	3,09	23,34
Sultengga	48,54	3,51	47,95
Gorontalo	60,42	1,01	38,57

Source: BPS, 2002

The table above shows that the participation of private sector in the rural electrification is very significant. The significance is even proved that about 4.3% of PLN's power is coming from private sector as shown in Table 6.

In a bigger scale Rural Electricity Co-operatives also play important role in rural electrification programme. Examples of rural cooperative in Lombok, Lampung, and South Sulawesi were developed in early 1980s. Unfortunately mismanagement has made 2 of 3 KLPs bankrupt. Right now there is only 1 KLP left in Lombok. The establishment of the cooperative was funded by USAID and right now has an installed capacity of about 8 MW serving more than 15,000 customers.

For the decentralised supply systems the role of private sector is even bigger especially in consulting, providing hardware, construction, and installation. PLN also rents diesel generators from private rentals. This condition happens especially in systems outside JAMALI.

Public Private Partnership in Rural Electrification Programme

Public Private Partnership (PPP) in Rural Electrification Programme is possible. Partnership between PLN as public entity with private investor/developer has been started since early 80's with the involvement of Co-operatives in the rural electrification programme. The partnership was based on Joint Decision between Ministry of Mining and Energy and Ministry of Co-operative and Trade No. 775/kpts/m/pertamben/1979, No 613/kpb/X/1979, 9 October 1979 about the Development of Electricity Co-operative and Kerosene Distribution.

Several mechanisms of PPP are possible to be implemented; for example BOO, BOT and ESCo. The first is BOO (Built Own Operate) with 100% private investment or little share of PLN or

regional government or PLN's subsidiary. The second is BOT (Built Operate Transfer) and the third is ESCo (Energy Saving Company). The last mechanism is new in Indonesia and nowadays there is no ESCo contract has been signed. There is no updated information about BOO or BOT contracts particularly for rural electrification programme or smaller scale projects. Some prospective small scale hydropower projects are still in the feasibility phase (e.g. projects offered to UHG and SPEI Enertrans).

The launching of Ministerial Decree about Small Decentralised Power Producers (PSK Tersebar) has also created positive impacts on PPP applications. For example the MHP Kali Maron in East Java that is interconnected to the grid. The MHP is owned by local community and for the interconnection project they got financial support from Energy Co-operative (private sector).

Future prospect of more PPP applications in the power sector is possible. Regional governments have more responsibilities in the electric power sector and to invest on infrastructure they need private partners. Areas outside Jamali where there are lots of power deficit might be potential area for implementation of PPP. PLN is open for cooperation with local government. Local government can bring investors and make cooperation with PLN or PLN's subsidiary. This cooperation will ensure the exclusivity of the contract with PLN.

Table 6 Power generated by private sector in 2003

No	Wilayahs	Own Production (TWh)	From Other PLN Units (TWh)	Buy/Rent Power (TWh)
1	Aceh	0,17	0,44	0,05
2	North Sumatra	0	4,86	0,02
3	Riau	0,04	0,8	0,62
4	West Sumatra	0,08	1,48	0,03
5	SBJ	0,15	1,99	0,08
6	Lampung	0,01	1,25	0,08
7	Bk. Belitung	0,18	0	0,08
8	Papua	0,2	0	0,04
9	Maluku	0,18	0	0,09
10	North Sulawesi	0,96	0	0,09
11	South-South East Sulawesi	1,42	0	1,05
12	East Kalimantan	0,78	0	0,33
13	Central-South Kalimantan	1,21	0	0,43
14	West Kalimantan	0,6	0	0,26
15	West Nusa Tenggara	0,34	0	0,11
16	East Nusa Tenggara	0,2	0	0,04
17	Bali	0,1	2,07	0
18	East Java	0,04	17,29	0,03
19	Central Java	0	11,59	0,1
20	West Java-Banten	0	29,42	0
	Total	6,66	71,19	3,53
	Grand Total	81,38		
	Percentage	8,18%	87,48%	4,34%

source: PT.PLN (Persero), 2003

Financing of Rural Electrification

Financing of Investments

Role of Financial Institutions

In Indonesia, where centralistic rural electrification programme has been practiced, the role of financial institutions (i.e. Central Bank) is important especially in channelling the loan from lenders.

Rural electrification programme was often financed by international development institutions in the form of soft loan. The loan is usually using "two steps loan" mechanism in which the implementing agency (which is PLN) will get the loan via government and the government's account is with the central bank (Bank Indonesia).

This "two step loan" mechanism is considered a costly mechanism because it needs administrative costs. PLN as a state owned enterprise can not directly get loans from development institutions. PLN can get commercial loans but it will depend on government's agreement especially from the MF and MSEE.

For activities initiated by private sector in the power industry the financial institutions might provide several services such as:

1. Capital Credit (commercial credit)
2. Insurance or
3. Investment (in the context of portfolio management).

The first and the second are usual business practices in Indonesia. The third is not yet commonly practiced by investment managers in Indonesia. But the interest of Banks in Indonesia to finance rural electrification projects is low if not to say there is no interest at all.

There is also financing institution called PNM that is providing capital for small/medium enterprises. PNM (Penanaman Modal Mandiri/Capital Investment for Self-Reliance) can also provide capital to install power system especially in the rural areas. Lack of energy specialist in PNM has resulted in zero rural electrification investments from PNM.

There is also a seed of Renewable Energy Cooperative that is focusing on providing soft loans to develop micro/small renewable energy systems for rural electrification. The cooperative does not limit the renewable energy system to one system such as hydro but also PV and other possible applications. The recent projects are the interconnection of two MHPs in East Java and also implementation of one 125 kW MHP in Central Java. The co-operative will likely to get capital support from ADB (Status October 2004).

Sources of Funds

For rural electrification projects the source of funds is mainly the government. The old system delivers the fund via PLN as the authority of electricity as APLN (PLN's budget). The new system uses funds from APBN (National Budget) and use PLN as the implementing agency. Regional government's budget (APBD) is also available for the development of rural electrification.

There are also loans from Multilateral or Bilateral Development Institutions (MBDI) such as World Bank, ADB or USAID. In Indonesia those three Development Institutions have worked in the field of rural electrification. Other Bilateral Development Institutions which are known working in the rural electrification field are JICA (Japan International Cooperation Agency) and GTZ (German Technical Cooperation Agency).

Not until recently the private sector could not access the BDI funds. BDI fund was usually available for NGOs or government institutions. Important recent example of private sector access to Overseas Development Aid (ODA) funds in the renewable energy sector is "MHP Cikahuripan Project". The project is initiated by JAMP (Joint ASEAN Mini-Hydropower Project) and involving PT.Chakra a private tea estate in West Java. The project was 50% financed by USAID using soft load mechanism (MHPP, 2003). This a captive power project so it does not have a big component of rural electrification or interconnection to PLN system.

Commercial loans for rural electrification projects in Indonesia are not common. In fact commercial financing is always the barrier of rural electrification implementation. Recent study of UNDP with micro-hydropower stakeholders in Indonesia showed that one important barrier is financing (IMIDAP, UNDP, 2003). The banks see the micro-hydropower project has uncertainty risks whose roots are:

- The market is uncertain whether to achieve economic of scale
- Micro-hydropower business is not fully understood. Banks see such projects are "missionary" type projects
- Uncertain selling price
- Limited community purchasing power.

PLN itself also has funds for the development of renewable energy especially mini hydropower for rural electrification.

Private sector active in rural electrification usually uses own equity to finance the projects. Private sector makes cooperation with local government to share the financial risks. Small/very small private entrepreneurs invest their own money to install power plants (e.g. small diesel generator).

International Cooperation Projects

The international cooperation projects are important to the rural electrification programme. Bilateral cooperation such as GTZ Mini Hydro Power Project, JICA, USAID and other bilateral cooperation projects have played important role in rural electrification. Especially USAID has pioneered the cooperation in the late 70s and also in 1980s.

Multilateral cooperation projects usually were channelled through MDI such as the World Bank and ADB. Those MDI usually give soft loans for rural electrification projects. There are also grants from UN such as Global Environment Facility Small Grant Programme (GEF-SGP) UNDP and also from UNESCAP.

BAPPENAS plays important role in the cooperation projects. BAPPENAS has the responsibility to check if the proposed cooperation is in line with the national development plan or not. For bilateral cooperation there is usually a need assessment study that will come up with a long list of projects. BAPPENAS with the corresponding institutions will discuss the long list and will finalise a short list that contains priority projects.

In the framework of multilateral cooperation BAPPENAS leads the negotiation committee and also assessing if the cooperation is inline with the development plan or not. It is also possible that BAPPENAS acts as the executing agency of the project.

The recent international cooperation project in the field of rural electrification is the preparation of full scale GEF project through PDF B mechanism. This short term project is preparing a full scale GEF proposal for Indonesia, especially in the micro-hydropower development. The project is supported by UNDP and has a goal to remove the barriers for the implementation of micro-hydropower for rural electrification.

Funding from Loans and Private Investments

PLN is considered as private now under the law 20 year 2002. This includes the subsidiary companies under PLN such as PJB, PT.PLN Batam and Indonesia Power. PLN and its subsidiary companies are now actively investing in power generation especially mini-hydropower. PLN and its subsidiaries are also inviting private companies to jointly invest on new power generation systems especially outside Jamali area.

Loans for rural electrification programme are usually coming from MBDI such as ADB, World Bank, or USAID. The loans are usually soft loans. There is no record of commercial loans from local banks.

Private investments, especially for the generation, in the rural electrification projects depend on the generation capacity and grid characteristic. For micro capacity private sector is actively investing especially in providing small diesel generators in off-grid remote rural. For bigger generation capacities, private investments are limited to the on-grid systems. This condition is highly affected by the low purchase power of rural communities. Domestic private investments

are usually in cooperation with PLN and local government. Foreign investments usually are for bigger scale generation capacity although there are also smaller investments in cooperation with local companies.

Rural Electrification: Special RE fund?

From the government there is special fund for rural electrification. Each year the government allocates small budget from National Budget (APBN) to extend grid and provide decentralised diesel generators. The implementing agency is PLN. Annual budget is approximately 850 Billion IDR. Target capacity for the diesel generators is below 100 kW. For fiscal year 2005 up to 20% of the rural electrification budget will be allocated to develop renewable energy systems.

From the regional governments special RE fund is available. The nominal of the fund is different from region to region. Regional governments usually prefer small decentralised systems such as PV, pico-hydropower, micro-hydropower or micro-wind power. The fund is part of the Decentralisation Fund and intended for the development of mining and energy sector. The difference on the allocated amount is because the characteristic of each province is different.

CDM (Clean Development Mechanism)

CDM is a hot issue in Indonesia especially when it is related to forestry CDM. CDM is one of three mechanisms to reduce the GHG (Green House Gases) emission. The other 2 are Joint Implementation (JI) and Carbon Trading.

Countries in the Annex I of Kyoto Protocol are obliged to reduce their GHG emission relative to their year 1990's emission. They have their internal targets and may apply several methods. CDM is a mechanism that relates annex I countries to non-annex countries (i.e. developing countries) in order to prevent more GHG emission. The avoided GHG emission credits then will be bought by the annex I countries and can be claimed as the effort to reduce the GHG emission of the countries.

Indonesia has already ratified the Kyoto Protocol and the people's representative already legalised the ratification although not yet becoming a law (status September 2004). The formation of DNA (Designated National Authority) is on going now (not yet formed as per September 2004). This means Indonesia is ready for CDM project. In fact Indonesia has a 2% share of CDM potential in the world. This number equals to about 125 Million Tons of CO₂ equivalent (until 2012). This huge market would certainly emerge as soon as all the necessary institutions established.

For renewable energy related CDM projects, Indonesia also has many potential especially in Geothermal and Hydropower. The fact that in Indonesia power generation is still depending on fossil fuel, the development of renewable energy related CDM makes sense. In fact seeing this opportunity PLN has already formed a CDM Implementation Group and also a CDM Consultative Group. Those groups will help PLN to internally prepare CDM projects and also make cooperation with other national or international institutions.

The potential to create CDM projects could give certain incentive to the investors. Income from selling certified emission reduction can be significant if the project can ensure a constant emission reduction to the buyer. The CER income would certainly bring more profit to the investor.

Applying for CDM also costs money. The marginal cost of CDM application will be smaller if the project is bigger (in the term of generation capacity for example). For mini hydropower projects it is better to make a bundle of projects than one project for one mini hydropower plant.

For foreign companies the position is even better because they can also directly bring the potential CER buyer. The hydropower project can be also a CDM project. This condition works better if the foreign company already has a close contact with Indonesian firm/companies who are active in CDM issue.

Pricing Issues

The pricing issues will always be related to the grid characteristic whether it is off-grid or on-grid. Tariff structure is only valid for areas that have grid extension while for remote off-grid areas tariff structure is local and not comparable to other areas.

Financing of Rural Electrification: is it reflected in the tariff structure?

The financing of rural electrification, especially those which are sponsored by the government, is not an issue for setting tariff. Even for decentralised system is usually not reflecting the investment of the project.

For private power generators, especially in remote areas, the tariff is always reflecting the investment. It is often in remote rural areas the people pay more than urban people in Java.

For each province in Indonesia, PLN has specific marginal cost of generation and basic production price (HPP). Now in most areas PLN sells electricity less than the marginal cost of generation (see Table 7).

Current Tariff Structure, past evolution and expected trends

The current tariff structure is based on Presidential Decree No.104 year 2003 dated 31 December 2003. This tariff structure is valid for year 2004 and until now there is no sign from the government to increase the electricity tariff. The political condition has forced the government (and the new government) not to increase the tariff in the near future (status October 2004).

The tariff evolution shows a significant change government policy. There is a tariff-increasing trend in the past 5 years. The tariff in year 2002 was even regularly increased in a quarterly basis. The average tariff should reflect the marginal production cost of PLN that is set to be US\$ 0.07/kWh. Although it's already increased for the last 3 years the average tariff is still not reflecting the marginal production cost. The fluctuation of currency exchange created certain difficulty because big part of the primary energy is bought in foreign currency (US\$).

There are three types of tariff systems: flat tariff, block based tariff, and peak/off-peak tariff. Flat tariff is valid for very small connection 220VA, government offices, street lighting, and also connection at high voltage. Connection at medium voltage is usually charged using peak/off-peak tariff. Household and commercial connections are usually charged using block based tariff.

Detail tariff structures are in the annex.

Table 7 Basic Production Price (HPP) 2003

Wilayah	Production Cost/kWH	HPP
Aceh	Rp 1.344,88	Rp 471,53
North Sumatera	Rp 695,28	Rp 528,11
Riau	Rp 981,65	Rp 580,00
West Sumatera	Rp 1.013,33	Rp 580,00
Bengkulu-Jambi	Rp 970,81	Rp 542,76
Lampung	Rp 847,82	Rp 551,85
Bk.Belitung	Rp 1.874,08	Rp 556,57
Papua	Rp 1.578,60	Rp 556,57
Maluku	Rp 1.873,08	Rp 556,57
North Sulawesi	Rp 924,93	Rp 556,57
South-South East Sulawesi	Rp 885,46	Rp 556,57
East Kalimantan	Rp 777,95	Rp 556,57
South East-Central Kalimantan	Rp 1.061,48	Rp 556,57
West Kalimantan	Rp 1.364,25	Rp 556,57
West Nusa Tenggara	Rp 1.241,38	Rp 556,57
East Nusa Tenggara	Rp 2.400,88	Rp 556,57
Bali	Rp 602,60	Rp 597,14
East Java	Rp 558,39	Rp 544,75
Central Java	Rp 593,43	Rp 502,99
West Java-Banten	Rp 534,58	Rp 520,58

source: PLN HQ, 2003

Issues of Cross Subsidisation

The subsidy is mainly aimed to households using 450 VA or less (220 VA). The bigger the connection class the less the subsidy is. Households having connections bigger than 450 VA do not get subsidy or very little subsidy.

The subsidy is actually compensated by the connection charge. The energy charge is actually does not reflect the production cost so to improve cash flow the connection charge is bigger. Connection less than 900 VA has small connection charge and the energy consumption is usually low. Income from connections less than 900 VA is small so PLN prefers higher connection with bigger connection charge. This is the reason why now PLN is only making new connections at 1300 VA or bigger. The government/new government will likely keep the subsidy policy. There will be reduction of subsidy but not in the near future.

Existing/Proposed Framework for PPA Tariff

The existing PPA tariff is based on the basic selling price or harga pokok produksi (HPP) in each province. PLN has the obligation to reveal the HPP to each prospectus investor. According to PSKTersebar regulation for interconnection to low voltage grid, the tariff is 60% of the HPP. For interconnection to medium voltage grid the tariff is 80% of the HPP.

For generation capacity bigger than 1 MW, the tariff regulation is still based on MD 996 year 1999. The minister should announce the PPA tariff annually and also the power allocation. This regulation will likely be replaced with a new one. The new regulation is still studied by DGEEU and all the stakeholders. The basic pricing principle is using fix price (fix buy price) especially for renewable energy source power plants (Status: September 2004).

This system is adopting German's system in their Renewable Energy Act. In the German's Renewable Energy Act the government set the buy price of electricity generated by renewable energy based power plants.

The new regulation will not be available in the next one year. Negotiation will be very hard with PLN especially when financial condition of PLN is not in very good condition. The most optimistic time frame for this regulation to be legalised is 2 years from now.

Basically PLN will pay 4 cost components:

1. Component A, Capacity Charge
2. Component B, Fixed Cost Operation and Maintenance
3. Component C, Fuel Cost
4. Component D, Variable Cost Operation and Maintenance.

A PPA can include all components or some components. PPA based on Long Term IPP includes all cost components. Negotiation will be done by a team from the government and PLN with the project owner. Such IPP PPA takes a long time to negotiate. For small or mini power plants it is not advisable to use such scheme.

Long Term Rental Agreement (LTRA) is another PPA scheme. It only does not include component C fuel cost. This mechanism is faster than IPP PPA, because negotiation is done only with PLN. The weakness of LTRA is that it is not really Long Term. The practice shows that the contract can only be made for 1 year and extendable. This contract condition will most probably change in the near future.

National Energy Policy and Related Investment Policy

Main energy policies

There are 5 important policies that are closely related to national energy policy:

- a. Energy Diversification. This policy is emphasising the importance to diversify energy utilisation which includes utilisation of renewable and non-renewable energy sources. The utilisation should create optimal energy mix which will bring maximum net benefit and support the sustainable development
- b. Energy Intensification. The search for new energy sources (both new, renewable or non-renewable sources) should be intensified especially when the fossil energy reserves are running out
- c. Energy Conservation. The conservation of energy should be implemented at every level of energy utilisation for both supply side and demand side
- d. Energy Pricing. The price of energy will be directed toward competitive price where the market works. The pricing should consider optimal energy utilisation, increasing the economic competitiveness, protect the consumers and also equality
- e. Environment. National energy utilisation should consider the environment and sustainable development.

The main energy policies show that there is support for the development of clean, new energy sources. This means the development of renewable energy sources is the main priority.

The problem is there is no measurable target of the policy. The programmes that support the policy are mainly sporadic and there is no continual programme to support the policy. Financial reason is mainly the argument of this condition.

Strategies for development of rural electrification

It is analysed that there are 3 strategies: implementation strategy, financing strategy, and institutional strategy.

The strategy for implementation of rural electrification is location based. There are two different strategies; grid extension and decentralised power generation.

Grid extension strategy is chosen if the area is relatively close to the national grid. This strategy is mainly implemented in JAMALI system where the grid is already extensively extended. Grid extension is expensive especially in the investment. Grid extension also decreases the performance of the power system i.e. bigger power loss.

Providing decentralised power generations can be done using many technologies. The usual practice is using diesel generators. Other than that solar PV and pico/micro hydropower are also the usual choices. The installation of diesel generators costs less than grid extension but the operational cost is higher. The government prioritise the use of local resources for remote rural electrification.

The implementation of rural electrification that is maximising the use of local resources is not optimal yet. PLN still prefers to provide easy to install diesel generator sets although the operational cost is high. The government (in this case MEMR) should not just make the commitment in words but also in action. There is a need for a regulation that especially regulates the use of rural electrification fund (from National Budget). In that regulation the government should say it clearly that x% of the fund should be used for the development of renewable energy sources (any sources suitable in the area). The regulation would be more effective if not coming from the MEMR because PLN is now also under the authority of Ministry of State Enterprises. It is better that the regulation is a government regulation of presidential decree.

The financing strategy implementation is basically relying on 2 sources of fund: the government and loan/grant from Multinational Development Institutions. The government allocates small

amount of money (around 800 billion IDR, source: DGEEU) annually for the development of rural electricity. This fund will be then spent by PLN for grid extension and installation of new decentralised power plants.

The other APBN fund is the decentralisation fund for provinces. Each provinces will get more or less 3 billion IDR annually (source: DGEEU) for the development of mining and energy sector. Using this money each province can develop the rural electricity.

The second source of fund is loan from Multinational Development Institutions. Projects from ADB are the example of this. ADB gives loans to Government of Indonesia (GoI) to develop electricity grid especially in outer islands.

The institutional strategy is basically showing who is responsible for the success of rural electrification. The new electricity law already shows this clearly. The government both central and regional have the responsibility to carry out rural electrification programme (article 7 Law 20 of 2002) and ensure the success. The government can not do this by it self; the government still needs the support from many players especially NGO, bilateral institutions, and private sector.

Renewable energy policy in the hydropower sector

At present the only special renewable energy policy is for the development of Geothermal potential. The Law 27 year 2003 regulates the utilisation of Geothermal potential in Indonesia. This law might be the start of renewable energy supportive laws in the future including law of hydropower.

Below are the important policies that support the development of hydropower sector:

a. Electricity Law (Law No.20 of 2002)

The electricity law is fully supporting the utilisation of renewable energy including hydropower.

Article 4 point 2 says:

“The policy of supply and utilisation of energy source for electricity generation is decided by the government considering security, equality, and environment sustainability aspects”

This shows indirectly that the government wants maximum use of renewable energy sources because those sources are relatively secure (not depending on imports from other countries), supports equality because they are local, and environment friendly.

Article 4 point 3 says:

“To secure primary energy availability for electricity generation, it is prioritised the use of local source of energy with an obligation to prioritise the use of renewable energy.

This point is clear enough to show that there is a will from the government to develop renewable energy sources including hydropower. It is just that the commitment can not be translated easily at the level of generation players. For example PJB (Pelistrikan Jawa Bali) is more interested to build a 100 MW coal power plant than 3MW mini hydropower plant (source: interview with PJB’s staff). The reasons of this are the complex procedures to develop hydropower and big up-front investment. The intangible benefits (such as energy security, environment conservation, and broader economic benefit) of installing hydropower plant can not be seen easily by electric power players in Indonesia now.

Complex procedures can mean anything from land acquisition to water right and this is already identified by the player (in this case PJB), so there is a need to simplify the procedure of the development of renewable energy source (especially hydro) or to standardise the procedure of hydropower development. Initiative should come from the central government because this issue is multi-sectors so that every sector should be accommodated equally.

Considering the multi-sector scope of this issue, the discussion of such standard procedure of hydropower development will take long time.

b. Water Resources Law (Law No.7 of 2004)

The law is basically regulating the utilisation of water resources and also roles of each stake holders especially government (central and regional). In this law the utilisation of water resources as power generator is supported in article 34 point 1 and article 43 point 1.

The utilisation of water resource should consider the environment preservation as stated in article 45 point 1.

For the water right permits issuance, local government has the rights. The water tax varies in each region. The minimum water tax is IDR 5/kWh produced (source: PLN) but in each province the values are different. For example in East Java PLN has to pay IDR 21 for each kWh produced, in Central Java PLN has to pay IDR 36 for each kWh produced, and in South Sulawesi PLN has to pay IDR 5 for each kWh produced.

In relation with the complexity issue in the point a, the water resource law does not give clear solutions. This condition is true especially in JAMALI area where there is a special institution called JASA TIRTA, which is the technical institution who manages the irrigation system in Java and also responsible for the conservation of related water shed area. In some cases (such in PJB case and also IBEKA case) the JASA TIRTA has made the project progress slower.

In the PJB case in East Java, the JASA TIRTA has made PJB change their planned power house site because JASA TIRTA said it is forbidden to build a structure in the proposed area without any clear reason behind. This made the already done FS has to be changed and therefore lengthened the development process and increases the cost.

In the IBEKA case, JASA TIRTA has asked retribution (-+ IDR 150/kWh) for the use of water from the river. IBEKA refuse to pay because the river is not in the water shed (DAS, Daerah Aliran Sungai) of Saguling that is managed by JASA TIRTA.

Those two examples show that there should be an overriding mechanism and simplified procedure of water utilisation. Such condition will affect the willingness of private sector to invest in power sector especially hydropower sector and decrease the competitiveness of renewable energy solution (hydro).

c. Policy on Renewable Energy and Energy Conversation (MD 004 of 2004)

The vision of this policy is establishing efficient energy supply and utilisation that is also clean, robust, and economically feasible in the framework of sustainable development.

The missions of this policy are:

- energy security
- maximising the utilisation of renewable energy
- encouraging the utilisation of clean and efficient technologies
- encouraging the energy saving culture
- increasing local technological capability especially for robust, safe, environment friendly and efficient technologies
- increasing the welfare equality.

This policy directly supports the development of any renewable energy source including hydropower.

There is lack of technical regulations on how the development of renewable energy sources should go. There is no clear target on how much renewable energy should play role in the energy sector in Indonesia. This condition is worsened by cheap energy price (although is changing now but still energy price in Indonesia is the cheapest among ASEAN countries) which reduce the competitiveness of renewable energy options.

d. PSK Tersebar Decree

PSK Tersebar decree (MD 1122K/30/MEM/2002) is one of government's strategies (there is also a Geothermal Law) to increase the role of renewable energy in Indonesia. The problem with this MD is that it still contains some critical weaknesses that can slowdown the implementation of PSK. There is no renewable energy obligation and some critical definitions are not clear enough. Until now there are only 2 PSK Tersebar (under MD 1122)

contracts that are signed by PLN. This is not a good sign because the MD is almost 2 years old (Status Mid September 2004).

PSK Tersebar decree clearly said that the supported energy source is renewable energy source and this includes hydropower. PSK Tersebar limits the capacity of hydropower up to 1 MW.

e. The Pre-Electrification Decree

The decree (MD 064K/40/MPE/1998) supports two types of technology: hydropower and solar PV. Hydropower and also Solar PV is the common decentralised solutions in rural electrification projects.

Investment and funding policy and support

a. Foreign Capital Investment Law (Law No.1 of 1967)

Foreign Direct Investment (FDI or Penanaman Modal Asing (PMA), is a status of doing business and governed primarily by the Foreign Capital Investment Law No. 1 of 1967, as amended by Law No. 11 of 1970. Based on the law the government has been introducing various policies and measures on FDI where now great efforts are given to promoting FDI in Indonesia

The PMA company is granted a period of 30 years to operate after its legal formation. If within the said period of time it commits an additional investment (expansion of its project), another 30 years of time is granted for the expansion project. This period can be extended for another 30 years.

The implication is that investors can make a long term contract to sell power or to have long term cooperation with local governments in generating power. This condition is a good sign for economic feasibility of the project. The contract time might exceed the payback period of the project.

Source: http://www.bkpm.go.id/en/investment.php?mode=baca&info_id=16

b. Domestic Capital Investment Law (Law No.6 of 1968)

Domestic Direct Investment, further referred to as Penanaman Modal Dalam Negeri (PMDN), is a status of doing business for entirely owned by Indonesian capital either jointly between company(ies) or individual(s) governed primarily by the Domestic Capital Investment Law No. 6 of 1968, as amended by Law No. 12 of 1970.

Source: http://www.bkpm.go.id/en/investment.php?mode=baca&info_id=16

c. Corporate Law (Law No.1 of 1995)

The most common legal entity to business community is a Corporate Company - Perseroan Terbatas (PT) either they are foreign direct investments or domestic direct investments.

Electricity Law article 1 point 31 said that "private entity is a legal entity that is established under Indonesian law which has a business in electric power". This article is clearly showed that the company that wants to do electric power business in Indonesia should be established under Indonesian Law. This means there is no chance for a foreign company to directly invest in Indonesia without creating an Indonesia Branch/Office which commonly takes form of a Limited Liability Company (PT, Perseroan Terbatas).

Source: http://www.bkpm.go.id/en/investment.php?mode=baca&info_id=16

d. Funding policy

According to Law No.20 of 2002, the funding for the development of rural electricity is mainly under the responsibility of the government (both central and regional governments). The law also encourages the participation of private sector in the electricity industry both in competitive area and non competitive area.

The law indirectly shows the funding policy of rural electrification projects. The policy needs more detail technical regulation for the implementation. Right now there is no specific regulation that supports the policy.

To support the policy, the government will likely launch a renewable obligation/non fossil fuel obligation policy that will force the generating companies (including PLN) to increase

the share of renewable energy power plants in their system. The policy will force players to allocate budgets for the development of renewable energy power plants. This means funds should be mobilised and this will likely come from private sector (banks). The policy will not come in the next 1 year (status: September 2004, source: DGEEU)

Local banks still see the rural electrification or renewable energy projects as "charity type" projects. That type of projects will not be so profitable in the short term. Banks usually give credits that will bring profit fast such as to:

1. Already established businesses (that ensures there is profit) as business development credits
2. Personals as consumptive or personal credits
3. Big companies as business development credits (usually in the same business group).

Normal banks are usually very difficult in giving credits to small/medium enterprises or businesses that are still in the development phase. Strong will from the governments has made some banks started to give credits for small/medium enterprises. There is even a special bank BRI (Bank Rakyat Indonesia) that is specialising in developing small/medium enterprises.

Strong will and commitment from the government is also needed to improve the involvement of local banks in the rural electrification/renewable energy projects and support the funding policy. A bank specialising in financing renewable/rural energy projects might be a good solution.

The unfavourable banking condition creates difficulties to have funding supports from local banks. Complexity to get an IPP contract with PLN also worsens the condition. Buying guarantee is usually only 1 year although longer contract time is also possible. Contract that is adjusted according to the financial feasibility would be an asset to get funding support from local banks.

Funding from government can not be expected for big projects. Private sector involvement is expected to finance such projects. Right now there is no limitation for foreign investment in the energy sector, so the private sector can use foreign funds to develop the projects.

The success of funding policy is basically inter-related with the success of other renewable energy/rural electrification policy. An easier procedure of private sector involvement in the rural electrification projects would certainly ensure the success of mobilisation of private fund sources. Deregulation of procedure is mainly aimed at PLN's procedure so that it becomes more transparent. Market creation can also give significant impact to the development of mature funding system. The government plays important role here.

More prospective scheme is cooperation with local governments. Local government and private sector will bring two side of funding source; the government and private sector. As long as the power generated is not sold to PLN then the complex procedure can be avoided and the success of funding policy and rural electrification project is secured. The involvement of Local Government in the project might also be a certain pressure to PLN to smoothly approve the project's PPA (although it might also not work).

e. Investment Incentives

Incentive for Electricity Generation Investment (Especially Renewable)

Until recently there is no direct incentive for renewable energy or rural electrification projects. The PSK Tersebar decree gives incentive for new investors. The incentive is the form of semi fix electric power buying price. It is called semi fix because it depends on the marginal cost of generation that is different in each area (wilayah). The buying prices are set to be 60% of local Basic Selling Price (HPP/Harga Pokok Penjualan) if the power plant is connected to low voltage grid and 80% of local HPP if the power plant is connected to mid voltage grid.

Ideally PLN in each Wilayah should announce its marginal cost of generation so that the investors could calculate the profitability of the project. In reality PLN is holding the number and has created a particular disincentive for new investments. This incentive is only valid for power plants with generation capacity less than 1 MW.

For renewable based power plants that have generation capacity more than 1 MW, the treatment is different. They are considered the same as big IPP so they have to negotiate

the buying price. There is no specific incentive for power plants bigger than 1 MW. The buying price is negotiated based on MD 996K/43/MPE/1999 with maximum capacity 15MW.

In the near future the pricing mechanism for both small (less than 1 MW) and medium (capacity still negotiated) capacity power plants might change. This mechanism has the same idea with the German's Renewable Energy Law in which the buying price of each kWh is fixed (premium energy price). The buying price will be different for each area and for each technology (Solar, Hydro, Biomass, or Geothermal). The regulation will not come in the next 1 year due to hard discussion with stakeholders (status September 2004).

The implication of this future incentive varies:

1. It is a good investment incentive for investor because there is no price negotiation anymore
2. It is possible that PLN will be reluctant to buy the power produced (especially in non-competitive area) if they consider the buying price is too high for PLN
3. It is possible that PLN it self will boost the development of renewable energy sources using its own equity/loan and somehow block private investments.

There is no special treatment, especially duty/tax facilities, for renewable energy technology. This means private investors that are importing renewable technologies will be treated the same as normal importer. The government has planned to give tax/duty facilities for renewable technologies.

In relation with renewable energy supporting policy, the government should start to list and clarify which items (renewable technology) that deserve duty/tax facilities. Coordination with Ministry of Finance will be needed. Until now there is no such list.

The government already envisioned some possible investment incentives:

1. Loan Guarantee from the government for renewable energy developers
2. Revolving fund for renewable energy development (mainly small scale)
3. No luxury goods tax for renewable energy items (for example solar thermal application)
4. Less subsidy for the energy price (The government does this step by step).

More incentives will likely be available in the near future. The short term program (5 years) of DGEEU will have the following targets:

1. Support for financing access
2. Support for accessing soft loans
3. Provision of interest free loan for renewable energy development (especially engineering)
4. Omission of subsidy
5. Premium price for energy from renewable energy sources and
6. Continue to support the reduction of duties, tax, and luxury goods tax etc.

The most promising incentive is the premium price for energy from renewable energy sources. The premium price will prevent exhaustive price negotiation and will give secure based of financial feasibility for the project.

Investment Coordinating Board's Incentives

General investment incentives come in the form of relief from import duties and tax exemption. These investment incentives are only valid for projects that are approved by the Investment Coordinating Board. These incentives are automatically implemented as soon as the project is approved by the board.

Import Duties

All investment projects of PMA as well as PMDN projects which are approved by the Investment Coordinating Board or by the Office of Investment in the respective districts, including existing PMA and PMDN companies expanding their projects to produce similar product(s) in excess of 30% of installed capacities or diversifying their products, will be granted the following facilities:

Relief from import duty will be given so that the final tariffs become 5 %. In the case of tariffs of import duty which are mentioned in the Indonesian Customs Tariff Book (BTBMI) being 5% or lower, the effective tariffs shall be those in BTBMI:

1. On the importation of capital goods namely machinery, equipments, spare parts and auxiliary equipments for an import period of 2 (two) years, started from the date of stipulation of decisions on import duty relief
2. On the importation of goods and materials or raw materials regardless of their types and composition, which are used as materials or components to produce finished goods for the purpose of two years full production (accumulated production time).

This means there are two possible mechanisms of import duties relief. The first mechanism is applicable when the project is approved by Investment Board. The project owner can submit a master list of capital goods that will be imported and then the Investment Board will issue a permit of import duty relief. The permit will be submitted to Custom office that will finally carry out the import administration.

The second mechanism is applicable when the project is to be expanded more than 30% of the original production capacity. The duty relief is the same for both mechanisms.

Based on the information above it is recommended for investors to register their investments to investment coordinating board/local investment board. Business cooperation with local government will make the approval easier and the application for import duty relief will also be simpler.

Tax Facilities

The government has introduced a Tax Bill No's 16, 17, 18, 19 and 20 of 2000 and applied since January 1, 2001. Based on this tax law, the domestic and foreign investors will be granted tax allowances in certain sector and/or area as follows:

1. An Investment Tax Allowance in the form of taxable income reduction as much as 30 % of the realized investment spread in 6 (six) years.
2. Accelerated depreciation and amortization
3. A Loss carried forward facility for period of no more than 10 (ten) years.
4. A 10 % income tax on dividends, and possibly being lower if stipulated in the provisions of an existing particular tax treaty.

The government has also introduced provisions No's 146 of 2000 of 2000 and 12 of 2001 on the importation and/or delivery of Selected Taxable Goods, and or the provision of Selected Taxable Services as well as the importation and or delivery of Selected Strategic Goods which are exempted from Value Added Tax

Source: http://www.bkpm.go.id/en/investment.php?mode=baca&info_id=16

Import Duties Relief for non-FDI/DI

Foreign direct investments/Penanaman Modal Asing (FDI/PMA) and Domestic Investment/Penanaman Modal Dalam Negeri (DI/PMDN) are two types of investment mechanism that to be approved by Investment Coordinating Board (ICB). The investment incentives are explained earlier. For non-FDI or non-DI projects there is also investment incentive mechanism that takes form of Import Duties Relief.

Basically the mechanism is the same; the project owner should make a master list of imported capital goods and then apply for import duty relief. The procedure involves a third party that is the verification bureau. The bureau will verify the list and then submit the list to Custom Office. Custom office will finally carry out import administration.

Investment without registering to ICB is possible. The will be simpler but the facilities might be hard to get. Custom office might not allow all the listed items to be relief from the import duty. The involvement of the third party will also cost money. So it is recommended to register the investment to the ICB.

Legal, Regulatory and Fiscal Framework

Existing Legislations relevant to rural electrification and hydropower development

a. Electricity Law No.20 of 2002

The Electricity Law supports rural electrification efforts. Article 7 said that the central government and the local government have the obligation to provide funds for rural electrification projects.

This condition opens opportunities for investors to cooperate with local governments to create rural electrification projects although the first priority will be given to state enterprise (article 30 point 3). The cooperation can take many forms such as Built Operate Transfer (BOT), Built Operate Own (BOO), or Built Lease Transfer (BLT). Cooperation with local governments is most possible in electricity deficit areas. Sulawesi Island is one of the deficit areas. Another form of cooperation is ESCO (Energy Saving Company) based on performance contract. There are many more schemes possible to be applied.

Considering the human resource capabilities in those areas, the appropriate cooperation scheme is a modification of BOO scheme with enough share goes to the local government or local private investors. BOT is not recommended because the sustainability of the power plant might be jeopardised when the project developer leave. Modified BOO cooperation will have some advantages compared to power selling contract with PLN. Bear in mind that these advantages only available for off grid power system (not interconnects to PLN grid):

- Simpler bureaucracy. Selling power to PLN needs two step decision processes. The first is at PLN Wilayah level and the second in at the PLN Central level. The final decision will be made at PLN Central. The decision making process might take long time and waste valuable time. Cooperation with the local government will ensure faster and simpler bureaucracy
- There is an urgent need from the local governments to electrify their areas. Urgent energy needs will be another reason for the local government to accelerate the bureaucracy process and even invest their own money
- It is possible that there will be no problem with land acquisition because the local government is part of the cooperation/consortium
- Pricing issue is simpler because it will be discussed directly by the investor and the local government (there is no need to negotiate with PLN because it is off grid)
- It is possible to develop smaller size resources with single ownership (there will be no difficulties from the local government because they need the power plants)
- More possibilities to involve local people and improve the welfare of local people.

The thing that should be carefully considered is the buying capacity of the people. It is often that people in remote areas in energy deficit areas have low buying capacity. This condition will surely affect the electricity price and payback period. The "take or pay" contract might not be a good solution considering the financial condition of most local governments.

One thing that should also be noted down is the grid system. If the grid is local grid inside one district then the permit is only from the district head. If the grid is crossing other district then the permit will be issued by the governor and if the grid is connected to the national grid the permit will be issued by the minister. Getting the permits might increase the complexity of the project. Installing close-mini grids/off grid system might be the best solution.

Energy deficit areas are usually still considered non-competitive areas. This condition will improve the simplicity of the project management because the project owner/investor can integrate the whole system. Integration of the system means from the generation to the distribution can be managed by one company.

Until today still there are no technical rules and regulations regarding the implementation of rural electrification. It is now depending on the decision of each local government on how to

implement rural electrification projects. It is also depending on the negotiation by the investors with the local governments.

The law also emphasises the importance of Local General Plan of Electric Power (RUKD, article 5)). It might be more influencing if the investor can involve in the planning stage of RUKD. RUKD will show the whole aspects of electric power sector in each area. The demand, the local primary energy potential, current supply and also the planning for the development of supply system. Based on RUKD, PLN and also investors can plan their investment in the area especially in the power sector.

Investors who are willing to invest in the area should understand the RUKD very well. The only problem is capability and capacity local government's institutions to construct RUKD. If the RUKD is already available, the investor should do a small re-check whether the RUKD shows the real condition or not. It would be better if the investor could give small assistance in the planning stage. Right now most of the district level governments still do not have RUKD. This condition is worse in areas outside JAMALI where there is big energy deficit.

Regarding the permission to establish a power generating company for public interest (IUKU), the law also regulates. Article 10 especially is emphasising the regulation of permit issuance in non-competitive areas. The major or the district head (Bupati) should be the one who issue the permit if the system does not cross the border of other districts (off grid system).

Cooperation with local government will simplify the permit issuance because there is an interest from the local government to as soon as possible electrify the area.

Article 41 says that in the non-competitive area electric power selling price is regulated by the central government or local government. Based on this, there are possibilities that the electricity price will be different in different areas.

The price should reflect the production cost and also environmental externalities. So it might be higher than current electricity price. For investor, the price is fine as long as the price can cover the production cost and also investment cost.

The law also says that all financial arrangement should use Rupiah as the valid payment currency (Article 42). Contracts using currency other than Rupiah are not valid.

b. Policy on Renewable Energy and Energy Conservation MD 004 of 2004

This Ministerial Decree is supporting the development of renewable energy. Any form of renewable energy is supported by the policy. Although there is a clear support for the development of renewable energy but there is lack of real tangible targets in the renewable energy sector for example:

1. There is no capacity target for renewable energy power plants
2. There is no time frame target for the development of renewable energy (to achieve certain capacity).

Based on those above, it is clear that the support for renewable energy development is still in the "political will" level. There is a will to develop renewable energy but the implementation is nearly zero.

Within the government the institution that is responsible for the development of renewable energy is Ministry of Energy and Mineral Resources. The implementation of renewable energy development is under the DGEEU or to be exact under the director of new/renewable energy and energy conservation.

The government identified that the barriers for the development of renewable energy are:

1. High investment cost
2. Renewable energy is not competitive compared to commercial forms of energy (fossil fuel)
3. The market is limited (in Indonesia).

The short term programme is aimed at overcoming the financing barrier. Access to funding and also soft loans provisions are some of the planned targets. Reducing the subsidy so that the energy price reaches its economical price is also one of the targets. Reducing the subsidy will be carried out step-by-step considering the economic and political condition of Indonesia.

In the long term the non fossil fuel obligation/renewable energy obligation is one of the targets. There is no exact time frame of the implementation but the long term programme is targeted until the end of 2020.

Based on the information above, the commitment of the government is high. It is possible to have positive supports from the government (in this case DGEEU). For project developers it is recommended to officially inform DGEEU if the project is approaching feasibility phase. It is possible that the DGEEU can use the necessary force to penetrate PLN's system so that the project can smoothly be implemented.

Supports from DGEEU might also be needed if the investor wants to create cooperation with local governments. The formal information to DGEEU is always important whether the project will be interconnected or not.

The support from DGEEU can be in any form. In the case of Dompuyong Micro hydropower interconnection, DGEEU even sends one of its sub-director together with project developer to negotiate with PLN East Java. The result is very positive because less than 1 month the proposal is reviewed and the developer is ready to sign a contract.

- c. Regulations governing the electric power purchase tariff for power supplied by small scale private and cooperative power producers MD 996K/43/MPE/1999

For renewable based power plant with capacity more than 1 MW and less than 15 MW outside JAMALI (article 1 point 2), the power purchase tariff is regulated by the MD 996K/43/MPE/1999. This regulation is still valid as long as there is no new regulation regarding power purchase tariff for mini scale power plants. This ministerial decree is assuming that the interconnection is done with PLN system. Interconnection with non-PLN system (for example KLP Sinar Rinjani in Lombok) is not regulated.

There are some specific issues with this Ministerial Decree:

1. The contract for non-firm capacity is only 1 year, while contract for firm capacity varies between 3-20 years and can be extended. For non-firm capacity power plants such as hydro, the contract arrangement is not favourable. The contract arrangement is not "bankable" and can prevent the project from getting financial support from banks. There is no certainty whether PLN will extend the contract or not after 1 year contract expires (Article 2). It is recommended to have a firm-capacity contract because the contract can be longer contract time
2. Mini hydropower is among the first priority energy sources (Article 4 point a). This is a full support for renewable energy
3. For power plants with capacity less than 500 kW; they are treated differently (article 2 point 2). In fact power plants with capacity up to 1 MW is treated as PSK Tersebar (MD 1122K/30/MEM/2002)
4. The selling price and capacity allocation is decided by the Minister annually. There is no certain deadline for announcement of selling price and capacity allocation in the decree. The investor should actively seeks information about this matter to DGEEU or MEMR
5. For firm-capacity contract the selling price includes capacity price and energy price. For non-firm capacity contract the selling price only includes energy price. All payment will be made in Rupiah currency (article 8 point 1 and 2). Firm-capacity contract proofs to be more profitable because there are two components of prices. Because the payment is in Rupiah currency, it is recommended to calculate the investment in Rupiah also so that the economic feasibility is better reflected. The price will be adjusted to the peak time price and off-peak time price
6. There is a penalty if the firm-capacity contract could not give the capacity more than 50% of the contracted capacity (article 8 point 4). This penalty is only valid for fossil fuel power plants. There is no penalty for hydropower plants. The penalty might be discussed or negotiated directly by PLN and the investor
7. For energy price, the price will be adjusted annually based on the PLN's marginal cost of production (article 9 point a). There might be a decrease in the PLN's marginal cost of production due to many reasons such as less diesel power generators running in the system. The investor should investigate the supply planning of PLN very well so that in the long term the marginal cost does not vary

so much. If it varies, the variability of the marginal cost will not be more than +-10%. With the government's commitment to increase energy price, it is likely that the marginal cost of production will not have a decreasing trend

8. The capacity price for firm contract, for the first 7 years, is the price at the time the contract was signed. The price is US\$ exchange rate adjusted, the exchange rate is using the Bank Indonesia exchange rate (article 9 point 2)
9. For hydropower plants, there are 2 options of energy price; energy price announced at the time of operation or 95% of announced energy price at the time the contract was signed (article 9 point 3). The first option gives uncertainty of energy price, although there is a possible increase in energy price. The second option gives certainty of energy price because it will be the same as long as the contract is still valid. Important here is future projection of PLN's marginal cost of production so that the profitability of the project can be calculated
10. PLN have the obligation to inform the public about electric power selling price and also capacity allocation (article 14). If it is hard to access the information, better use the DGEEU channel and pressure
11. PLN will do the evaluation of interconnection proposals. The time frame of proposal evaluation is 60 days (article 16). PLN should inform the applicant whether the proposal is accepted or not (article 17). There is no time frame for this. The decree does not regulate the time frame of PLN's feedback. There is possibility that PLN does not evaluate the proposal and let the applicant waiting without any clear status. There is no penalty for PLN if PLN exceed the time frame of proposal evaluation. There is no mechanism for applicants to check the status of proposal evaluation. Active approach to PLN is needed but it might increase the corruption hazard
12. The investor should not use commercial foreign loan (article 21). If in fact the investor is using foreign commercial loan then the investment is not possible, unless the investor declare the loan as equity (AKA cheating).

This decree still has some critical weaknesses that open opportunities to slow down private sector involvement in the electric power sector. Once again, it is very important to formally inform DGEEU of the investment process. DGEEU which has full commitment to develop the renewable energy and also improve rural electrification will 100% support the project.

d. Small-scale Distributed Private Power Producers MD 1122K/30/MEM/2002

This Ministerial Decree is regulating power purchase for renewable energy power plants which have capacity less than 1 MW. Except capacity, there is also a significant difference between MD996 and MD1122. The significant difference is the energy price. If the mini power plants the energy price is announced by the ministry, for the small capacity power plants the energy price is based on local basic selling price (HPP)¹.

Some important issues are:

1. It is limited to small scale businesses including cooperatives, small private entrepreneur etc (article 2). There is no chance for multinational companies except maybe if involving local cooperative with an innovative cooperation scheme
2. PLN conducts the proposal evaluation within 60 days time (article 4). Whatever the result PLN has to inform the applicant (article 5), the problem is there is no time limitation for responding the proposal. As in the case of MD 996, PLN could just ignore the proposal and does not give any response. There should be a time limitation for giving response (positive or negative). Active effort from the investor should be done to check the status of the proposal to PLN
3. In the area where there is already PLN's distribution network, PLN is obliged to buy the power produced as long as the requirements are fulfilled well (article 10). This is a positive sign of government's commitment to improve the involvement of private sector

¹ HPP/Basic Selling Price is defined as electric power generation cost divided by the sold energy (kWh). It is not representing the true marginal generation cost.

4. The contract can only for non-firm capacity contract (article 11). The problem is there is no article that regulates the contract arrangement. Not like MD 996 which regulates the contract time frame, this PSK Tersebar decree does not regulate contract time frame. This condition creates difficulties for small investors if they want to use the contract with PLN as loan collateral. In some PSK Tersebar cases, the contracts are signed for only 1 year. There is possibility that PLN will refuse to sign the contract for another year
5. Energy price is set to be 60% of HPP for low voltage interconnection and 80% of HPP for mid voltage interconnection (article 14). Using HPP as the basic calculation gives an opportunity to PLN to increase the profit. This statement is true especially for areas outside JAMALI which have HPP less than the real production cost. (See Table 7). It will be a better incentive if the basis for the price calculation is the marginal production cost instead of HPP. The incentive is even bigger in areas outside JAMALI where the marginal production cost is way higher than the HPP such as in East Nusa Tenggara and Maluku. In such places electricity generation is depending on diesel generator sets which have high operational cost.
6. This decree is only valid for renewable energy sources such as: wind power, solar power, hydro power, geothermal, dendrothermal, etc. (article 1 point 2). This point clearly shows the support for the development of renewable energy.

Because there are some critical weaknesses this decree is not very effective in improving the involvement of small scale private sector in the electricity generation. It is proved by the facts that some projects are having difficulties even in the application stage. Support from DGEEU is basically needed especially it is already written in the decree (article 19). Direct support from DGEEU has proven to be very effective in speeding up the process of application.

e. Rural Pre-Electrification MD 064K/40/MPE/1998

Rural electrification decree is another sample of government's commitment to develop the rural communities (especially remote rural communities) and the renewable energy sector. The basic idea of the decree is the provision of renewable energy solutions such as Solar Home System or Micro Hydropower for remote rural communities. If one day the grid extension touches the area then the hardware should be transferred to other sites that need power.

The government finances the project using rural electrification scheme taken from National Budget that is allocated for PLN. The implementation of the programme is carried out by PLN. Local cooperative will participate in the programme by managing the power plant, operating, maintaining, and bill collecting.

The decree limits the application of renewable energy to solar power system and micro hydropower. Micro hydropower is defined as a hydropower plant with capacity up to 200 kW (article 1 point 3). After project completion the micro hydropower plant will be transferred to local government. In the case of Solar Home System, if the area will no be electrified by grid extension in the next 5 to 10 years, the assets will be handed over also to local government. If in 5-10 years there will be grid extension then PLN will take all the SHS and move them to new village/s after the grid is installed.

This decree is now not really relevant because PLN already liquidated its Rural Division (Divdes). For investor this decree is also not really relevant because there is no article says about involvement of private sector.

Analysis of taxes and duties

Import Duties

Relief from import duties is possible in Indonesia. The regulations says that if the investor wants to increase the production capacity in excess of 30% of the current production capacity then the investor will be granted import duty relief. The final import tariff will become 5% except when the tariff is already below 5% as stated in Indonesian Custom Tariff Book. New investment that is approved by Investment Coordinating Board will also have import duty facility.

With this option investor can make a two steps investment strategy. For example if the potential energy generation is 1 MW, the investor can first install 500 kW and the rest of capacity will be installed later. The investor should determine which item should be imported in the first phase and also in the second phase. In the case of mini-hydropower plant the design should consider dual or more turbines operation. With this strategy there will be 2 times of import duty relief for different components of the project.

The two steps investment mechanism can be related to the future power demand in the area. Based on the RUKD the investor can set the first investment plan and then after a while (relative) the second investment plan can be set.

There is no special import duty relief for renewable energy products. Information from PT.Citra Katon (a wind turbine and solar cell importer) showed that the Indonesian Custom officers have lack of knowledge about renewable energy products. For example mono crystalline PV cells are considered as luxury goods because there is "crystal" word in the name. The government is intending to expand the special import duties for renewable energy products. Until now this issue is still under discussion and no real application yet.

The problem is more with the custom office or officer. It is still a common practice that businessmen pay some money to get their imported products from the import gates (airport or seaport). The custom officers are sometimes not really mastering the product list. They sometimes consider renewable energy products as luxury goods or as forbidden goods without clear arguments.

Fiscal measures are easy to be developed or construct but in reality the application is very hard if the custom officers do not understand very well about the imported products.

Tax Facilities

Tax system in Indonesia is based on Tax Bill no 16, 17, 18, 19, and 20 of 2000. Those bills are applied since 1 January 2001. Based on those laws investor can be granted tax facility that is mainly tax reduction. There is no tax holiday mechanism in Indonesia. Tax facilities are valid for investments in certain sectors or certain areas. The sectors are mainly those that can boost export. The areas are mainly areas that have many job seekers.

The tax facilities are:

1. Investment tax allowance in the form of taxable income reduction as much as 30% of the realised investment spread in 6 years
2. Accelerated depreciation/amortisation
3. A loss carried forward facility for period of no more than 10 years.

Based of the government regulations No 146 of 2000 and 12 of 2001, the government also provide other form of tax facilities. Those regulations regulate the goods or services that can be exempted from the value added tax.

The problem with tax system in Indonesia is that there is no special facility for the development of renewable energy. All the incentives (duty and tax) are design for the development of export industries. Investment in renewable energy could get fiscal facilities but maybe at the lowest percentage.

The scoop of taxation in the region is limited. Regional/Local tax system is regulated via government's regulation No. 65 of 2001. The important tax component in relation to the hydropower project is the water resources usage tax. The tax value per unit water used varies for each region. There is no national standard for this.

This water tax is important component for hydropower project. Tax will reduce income of the project therefore the tax should be reduced. Reduction or even exemption of water tax is possible if the investor works together with the local government.

Although water usage tax is important component of regional income, but the implementation of water usage taxing is not common especially water usage by common households. Water tax is commonly applied for big industry such as: drinking water supply, bottled water industry, or water usage by industry. It is possible that hydropower project will be grouped as "big industry" but local discussion/negotiation will certainly important to reduce/exempt the water tax.

Implementation of Electricity Law, Competitive and Non Competitive Areas

General

Implementation of Electricity Law comprises of several activities. According to the Blue Print of Electricity Sector Development there are at least 11 important development programmes. Those development programmes are:

1. The determination of National Grid
2. The supply of electricity demand
3. The supply of primary energy for electricity generation
4. The settlement of IPPs
5. The institutional development
6. The preparation of competitive areas
7. The development of non-competitive areas
8. The community development
9. The improvement of local products/services utilisation
10. The development of electricity generation business (core business)
11. The development of supporting electricity business (non-core businesses).

The national grid is basically PLN's high voltage/ultra high voltage transmission grids. Interconnection to those grids both via low voltage grid and medium voltage grid will be treated as interconnection to national grid. This is basically saying that all the available PLN's grids are the national grid. The implication of national grid determination is wide. It determines who will give the permits for the generators. The national grid is already determined by the Ministerial Decree 55K/30/MEM/2003 dated 7 February 2003. All information about the national grid is in the annex.

There are two important sub-sectors in the supply of electricity demand; the supply sub-sector and the demand sub-sector. The supply sub-sector is aimed to secure the supply by increasing electricity supply. There are many strategies but the basic strategy is optimisation of available capacity and increasing the involvement of small/medium distributed generators. This is a strong message from the government that more private involvement is needed especially in the non-competitive areas where there are energy deficits. Special contracts are encouraged to secure the supply to those areas.

The primary energy supply programme is aimed at the reduction of fossil fuel dependency and increasing the role of renewable energy. The least-cost and environmental protection principles are used as the foundation of primary energy supply programme. Non-fossil fuel obligation policy is already in the sight (at least 5% of total energy produced) and new innovative incentives are also coming in the future. The problem with this programme is lack of "renewable energy awareness" in the level of active players (i.e. PLN). Energy pricing policy is not one of the strategies here although low energy price is the "always identified" barrier for energy conservation and renewable energy promotion.

Re-negotiation with problematic IPP is continually processed and now most of them are successfully re-negotiated. Community development is basically a broader interpretation of rural electrification. Community development or Comdev is not only intended to electrify rural communities but also in parallel creating economic development. Any companies active in the electricity sector should play leading role in the comdev in each respective area.

Local producers will be encouraged to produce quality products that can support electric power industry. The local services companies are also encouraged to improve their competency and capability so that their service is at high standard. Right now there are some potential local producers especially for hydropower. For micro and pico size hydropower system, at least there are 2 very competitive producers in Bandung (both are private producers). For mini size

hydropower system, at least there are 2 experienced producers (both are state owned companies).

The universities in Indonesia are not very active in developing renewable technology. Most of the hydropower technology mastered by local producers comes from developed countries (mainly Germany and Swiss). Innovative technology developed by local universities is none. It might be very important for technical universities in Indonesia to start making cooperation with foreign universities to master the renewable energy technology especially hydropower technology.

New power generators should be encouraged to establish their business especially in the competitive area. In the non-competitive area new players should also be introduced. Security of supply is important in both areas. The government also encourages the development of supporting business such as system maintenance, electricity distributors, etc.

Institutional restructuring

The institutional restructuring in the electricity sector is an important issue. This issue especially differentiates the role of government's institutions/ministries and other independent institutions in the new electricity structure.

The regulative role is under DGEEU of ministry of energy and mineral resources. DGEEU will setup regulations, standards, and also issue permits. The ownership role is under the ministry of state's enterprises. The state's enterprises ministry will focus more on developing a healthy competitive company i.e. PLN which still will be most important player in the sector.

The separation of roles will create dualism within PLN unless there is a very good coordination between the two ministries (that will likely not happen). PLN it self has the need to improve company's performance (especially financial) so a synergetic policy of the two ministries

PLN also has to be more efficient in operation. Distribution of power among the Wilayahs (that includes financial power) will encourage creativity and innovation so that better service can be achieved. Improving the internal performance is constant homework for PLN's board of directors. Improving the transparency in the system is the key especially to improve private sector's participation.

BAPPETAL or Market Supervisory Board is also an important institution to be established. The deadline of BAPPETAL formation was on 23rd of September 2003. Before the competitive markets are established, BAPPETAL has the obligation to prepare necessary things that support the development of competitive areas such as several businesses' codes, proposed competitive areas etc. The main mission of BAPPETAL is to avoid monopoly in the business.

The formation of BAPPETAL team is based on the Government's Regulation No.53 of 2003 dated 3 November 2003. This means the legal foundation of BAPPETAL was already 2 months late. This means the formation of BAPPETAL team also late. The latest status (September 2004) of BAPPETAL is that there are 10 candidates for the committee. Out of 10 there will be only 5 that will sit in the committee and the president will be the one who chooses the member of the BAPPETAL committee. The political condition now (presidential election etc.) prevents the progress of team formation. The source from DGEEU can not make sure the time frame of BAPPETAL formation. It is likely that the team will not be available within the first 2 trimesters of 2005. The most optimistic time frame will be in 2006 that BAPPETAL will officially start working.

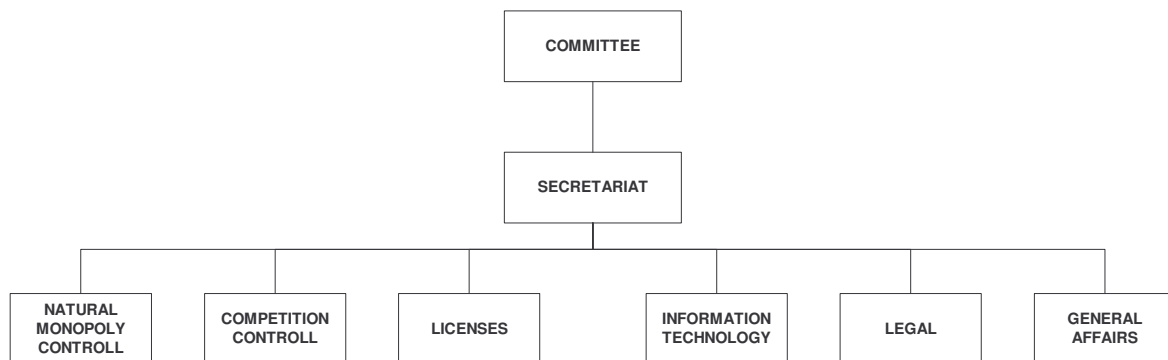


Figure 10 The organisation structure of BAPPETAL

Beside BAPPETAL other important institution is the certification institution. There are at least 3 kind of certification institutions: Installation Certification Bureau, Product Certification Bureau, and Competency Certification Bureau. Those certification bureaus are very important part of the industry's structure because they will ensure quality standard of product.

Competitive Areas

There are some conditions for an area is categorised as competitive area. Those conditions are:

1. Electricity price is already reaching the economic level (generating cost is at least the same as HPP)
2. There is a competition in primary energy supply
3. There is already BAPPETAL
4. There is already rules and regulations for competition
5. The infrastructure for competition is ready (hardware, software, human resources)
6. The system (technical) is ready to adapt the competition
7. There is equality of business entities which will compete
8. Fulfil other conditions asks by BAPPETAL.

The deadline of limited competition implementation is 23rd of September 2007. This date is exactly 4 years after the establishment of BAPPETAL (ideally).

Batam Island is the first area to implement competition. Batam is chosen based on some reasons that might not in line with the conditions above. The electricity tariff in Batam is different from the normal PLN's tariff. The connection fee is generally higher per kVA. The energy price is generally higher per kWh. The problem is Batam is highly relying on diesel generator sets. The production cost is generally still higher than HPP (HPP=Rp.556,57/kWh and production cost is around Rp.900/kWh, see Table 7).

It is possible that the reason for choosing Batam is because Batam is set to be a centre of multinational business and trade activities (due to its location near to Singapore). The implementation of competition in Batam will likely take longer time than it is planned to be. Year 2007 seems to be very optimistic.

JAMALI (Java Madura and Bali) system is planned to be the next area for competition. With the delay in BATAM, the implementation in JAMALI will also be delayed.

The delay in the implementation of competition has at least 3 important implications:

1. Companies can prepare their business better to face the competition and seek for better opportunity to invest
2. The government has to spend more money for electricity subsidy and more time to restructure the industry
3. The transition period will take longer so there is no certainty in the legal situation (for example to get a business license) because the regulations will also change.

In general the delay in the implementation of competition will create negative impact to the sector. Process that would take longer time is the separation of business based on function (generation, distribution, etc.). This process is very much involving PLN because PLN is the biggest vertically integrated electricity business entity in Indonesia (JAMALI). Although the generation function is already separated (to Indonesia Power and PJB) but the rest of the system not yet separated. The condition in Batam is more or less the same.

Despite the delay some codes and rules important for the competition is already developed and disseminated:

1. Market rules for JAMALI system is already constructed and disseminated
2. Grid code for JAMALI system is already constructed and implemented.

Non Competitive Area

In the non-competitive area, the model of the sector is different. The role of central/regional government to control and monitor the industry is still big. Vertically integrated electricity business is encouraged and allowed. This opens opportunities for private companies to construct their own grid and distribution system. Setting the energy price/electricity price is still under the responsibility of the government (central or local government).

The government has the obligation to provide electricity to rural communities and underprivileged groups. This condition creates opportunities to jointly construct hydropower plant with local government. Cooperation with local government can be beneficial because local government can provide some privileges such as easier process to get permits, the usage of government's land, exclusive water rights etc.

To develop new grids the fund from transmission retribution can be utilised (source: Blue Print Electricity Sector). This practice will only be available if the competitive market already operating. It is not known who is eligible to utilise this fund and the procedure to get the fund. It is assumed that only State's Owned Company (i.e. PLN) that will be eligible to use the fund. It will be a good incentive if investors can have access to such fund and help them to extend the grid to remote rural areas. If the schedule to start the competitive area can be followed strictly then the fund can be utilised the earliest in 2009.

Guidelines for private sector participation in hydropower development

General Information

According to the law 20 of 2002 article 1 point 31; any private companies working in the electric power sector must be a legal entity which is established based on Indonesian Law. This means any foreign investors should establish an Indonesia based company (PT or Perseroan Terbatas or Limited Liabilities Company).

Article 8 point 2(a) says that electric power business includes power generation. This means any investors interested in power generation; the participation is guaranteed by the law both in competitive area and non-competitive area. In the competitive area the generation and distribution will be implemented competitively (article 17 point 1) while in the non-competitive area the role of integrated company still big.

Investing in Indonesia can be done two ways: via Investment Coordinating Board/Local Investment Board or bypassing the Investment Coordinating Board (BKPM). The size of investment is usually determining the procedure of investment. Generally investment above 500 thousand US\$ is recommended to use the Investment Board procedure (Source: BKPM). It is valid to use either Investment Coordinating Board (Jakarta based) or Local Investment Board. If an investor wants to develop a 2 MW hydropower plant then it is better to use the Investment Board procedure.

Not using Investment Board procedure provides simpler project development but lack of fiscal incentives.

Basically there are 7 main steps to start a power generation business:

1. Setting up a company (limited liability company or Perseroan Terbatas or PT)

2. Apply for Tax Registration Code Number (NPWP)
3. Applying for PPA (if interconnected to PLN)
4. Applying license to generate power for public service (IUKU)
5. Registering the investment to the investment board
6. Carry out EIA study (if EIA is not part of Project's Feasibility Study)
7. Construction phase
8. Operation phase.

The steps above assume that the investor already studied the potential sites of hydropower, found local partners to develop the site and ready to invest.

Based on the steps above the following institutions should be contacted:

1. Lawyer office. To get the Certificate of Association of the PT (Limited Liability Company)
2. Local Tax Office. To apply the Tax Registration Code Number
3. Local EIA Consultant. To study the environmental impact of the project and produce EIA documents. The EIA might also be an integrated part of the Feasibility Study
4. Local EIA Board. To get EIA approval
5. Local PLN Office (Dinas Level and Wilayah Level). To apply PPA
6. DGEEU or Region's Head Office. To apply License to Generate Power for Public Interest (IUKU)
7. Investment Coordinating Board (BKPM) or Local Investment Board. To register and get approval of investment

When it comes to the site acquisition and construction, the role of local government is bigger. Local government (district government) will issue approval/licenses as follows:

1. Location permit/Land certificate
2. Building erection/construction permit
3. Nuisance permit
4. Permission to employ expatriate will be issued by provincial government.

The role of local government is big so it is highly recommended to cooperate with local government to secure investment locally.

Investment Procedure (Investment Coordinating Board Approval)

The procedure and requirements for investing in Indonesia is regulated by Head of Investment Coordinating Board (BKPM) Decision No. 57/SK/2004. The investment approval from the head of Investment Coordinating Board will be useful in the application of PPA.

Basically investment can be done by anyone either Indonesian nationality or foreigner. The entity/person should register the investment plan by filling up some forms. All forms are available in the National Investment Coordinating Board office or Local Investment Board office. The licenses issued by BKPM are:

1. Identification Number of Limited Importer (Angka Pengenal Importir Terbatas/APIIT)
2. Business License/Permanent Business License/Expansion License
3. Plan of Expatriate Employment
4. Visa Recommendation for Expatriate
5. Expatriate Employment Permit
6. Extension of Permits for Expatriate Working in More than 1 Province
7. Fiscal Facility of Relief/Reduction of Import Duty of Capital Goods Importation.

The Decision also identified other licenses or permits that are issued by other bodies important for the investment implementation. Those permits/licenses are:

1. Extension of Permits to employ expatriates in one province will be issued by respective provincial government
2. Location permit will be issued by district government
3. Land Certificate will be issued by district government
4. Building erection permit will be issued by district government
5. Nuisance permit will be issued by district government.

According to the need, the following forms should be completed by the investor:

1. Form I/PMDN for registering new domestic investment (PMDN) or Form I/PMA for registering new foreign investment (PMA)
2. Form II/PMDN or II/PMA for permission to expand the investment
3. Form III/A for permission to change the investment status from PMA to PMDN
4. Form III/B for permission to change the investment status from PMDN to PMA
5. Form III/C for permission to extend the time of project implementation
6. Form III/D for merger
7. Form IV/A for Approval of Capital Good Master List
8. Form IV/B for Approval of Supporting Material Master List
9. Form for Applying Identification Number of Limiter Importer (APIT)

All forms and important enclosures can be found in the annex.

The important forms for new investment, especially hydropower, will be form I, form IV, and APIT form. Form I is the investment registering form. After receiving this form BKPM will issue an Investment Approval Letter (Surat Persetujuan/SP) that is signed by the head of BKPM. This SP can be used to apply the PPA and sign the PPA contract.

Form IV is important especially for applying investment facilities such as import duty relief. Both capital goods and supporting material can be the subject of duty relief. As long as the BKPM approve the master lists then the custom will automatically reduce or relief the import duty for those listed goods.

APIT form is important if the investor intends to import the capital goods and supporting material by it self. In the case importation is done by other company then this APIT form is not needed. The duty facilities still valid even the importer is different company.

Establishing Company (PT) Procedure

Establishing a limited liability company or a Perseroan Terbatas (PT) is quite easy in Indonesia. The applicant just has to go to a Lawyer and bring necessary requirements such as:

1. Copy of Identification Card(s)
2. Statement of partnership if the company is funded by some sources
3. Statement of amount of capital
4. Statement of company's line of business.

The applicant(s) should present in front of the lawyer and provide all the requirements. The Lawyer will produce the Articles of Association and then register the company to the Department of Justice and Human Rights. In the period of 90 days the local court will issue the list of approved limited liability companies (PT).

Establishing a PT is important because the Law 20 of 2002 says that "private entity is a legal entity that is established under Indonesian law which has a business in electric power". So in order to be able to involve in the Indonesian Power sector any private entity should be established under the Indonesian Law and a PT represents such entity (although other type of

private entity should also be possible such as: cooperative, CV (Commanditaire Vennootschap), Firma (Fa) etc.).

When cooperation with local investor or local government is possible then it will be better if the local partner takes care the establishment of the PT. Establishment of the PT should not be done until there is clear division of responsibilities between cooperating parties.

Tax Registration Code Number (Nomer Pokok Wajib Pajak)

According to the law 16 of 2000, any person/business entity has the obligation to register to the local tax office to get Tax Registration Code Number (NPWP).

The important requirements are:

1. Copy of Article of Association or Identification Card
2. Information of the business:
 - a. Location (address of both the investor and the project)
 - b. Business type.

The office will issue the NPWP as soon as the necessary requirements are fulfilled. NPWP is an important requirement in registering new investment. If the investor wants to use the tax facilities such as income tax reduction and VAT exemption/reduction; NPWP is also needed as identification.

Environmental Impact Assessment Procedure

Environmental Impact Assessment is needed in two important step of a hydropower project. The first is the PPA application and the second is the project implementation. EIA or AMDAL (Analisis Mengenai Dampak Lingkungan) is important for power projects with capacity more than 100 MW. For power plants under 100 MW only Impacts Mitigation Actions (UKL) and Mitigation Monitoring Actions (UPL) are needed. UKL and UPL are basically part of EIA with smaller scope.

The procedure of EIA is as follows:

1. Permission to implement project activities to the local government (depending on the size of the project, bigger size projects should have permission from central government)
2. Applicant submit the Reference Scheme to the local EIA Board (or National EIA Board if project size is big enough (more than 50 MW))
3. Applicant compose the EIA, Plan of Impact Mitigation, and Plan of Mitigation Monitoring
4. Applicant submit the EIA, RKL and RPL to the local EIA Board/National Board
5. EIA Approval and then project implementation.

Basically EIA touches several aspect of environment: physical environment, biological component, and social component. In Indonesia there is no specific regulation about environmental impact due to civil construction in water way (e.g. impact to the migrating fishes). The applicant should be able to identify impacts at the most detail level and provide plan to mitigate those impacts and monitor the mitigation procedures.

Regularly, at least twice in a year, the Impact Mitigation Actions and Mitigation Monitoring Actions should be monitored. The monitoring result should be reported to either local EIA board or National EIA board.

There is no exact time frame for EIA application because it very much depends on the scale of the project. Scale of the project will determine the scale of surveys needed.

For mini hydropower project EIA assessment/evaluation will be done by provincial level EIA board.

Local EIA board is usually under the administration of BAPEDALDA (Badan Pengendalian Dampak Lingkungan Daerah). National EIA board is under the administration of BAPEDAL (Badan Pengendalian Dampak Lingkungan).

Application of water rights

The applicant of PPA should also attach a license to use water. This license is issued by local government from the respective department. Water rights license includes also the value of water tax has to be paid by applicant. The value of water tax is at minimum IDR 5/kWh electricity produced.

Application of water rights is valid for hydropower development.

PPA Application Procedure

The context of the discussion here is for power plants less than 10 MW. PPA for mini hydropower plants is regulated by MD 996k/43/MPE/1999. Article 15-20 of the decree give information about procedure of PPA application. The procedure is as follows:

1. The applicant should submit PPA proposal to PLN with documents below enclosed:
 - a. Legal status of the entity
 - b. The recent financial balance
 - c. Map of power plant showing the distance from the nearest grid
 - d. Drawings of power plant and specifications of equipment installed
 - e. Written information about fuel and production process
 - f. Diagram of metering system, protection system and interconnection system
 - g. Construction design and also calculation of energy availability/production that will be supplied to PLN
 - h. Schedule of construction and also operating time
 - i. Water use license.
2. PLN will assess the application maximum in 60 days, and if the application is approved; the approval will be given in written
3. Based on the PLN's approval, the applicant should apply the Power Generation for Public Interest (IUKU) License to DGEEU
4. Preliminary IUKU approval will be given to the applicant and based on this preliminary approval the applicant can register the investment to BKPM (Investment Coordinating Board)
5. PPA contract can be signed as long as BKPM already approved applicant's investment.

This PPA procedure reduces the risk at PLN's side because the procedure does not only relate PLN with the applicant but also with DGEEU and BKPM. PLN's position here is also stronger because there is no clear implication if PLN does not give clear response to the PPA proposal. The decree does not assume PLN's silence as approval to the PPA proposal.

IUKU License Application Procedure

IUKU or Power Generating for Public Interest License issuance depends on 2 aspects:

1. Interconnected to national grid or not (i.e. PLN's grid)
2. The area covered by the local grid.

If the grid is interconnected to national grid then the IUKU issuance will be the responsibility of DGEEU or BKPM (according to MD 996k/43/MPE/1999 article 22). If the grid is not interconnected to the national grid then the Region's Head (either provincial or district head) will issue the IUKU (according to MD 1455k/40/MEM/2000).

The coverage area of the local grid determines who will issue the IUKU. If the grid covers an area within one district then the Head of the District will issue the IUKU. If the grid covers an area within more than one district then the Head of the Province will issue the IUKU.

The basic requirements for applying IUKU are the same. The project developer should provide information about:

1. Project Location
2. Type and Capacity of electric power generator/transmission/distribution
3. Type of primary energy used
4. Business territory
5. Schedule of construction
6. Schedule of financing
7. Schedule of operation
8. Schedule of Expatriate Employment
9. Drawings, maps explaining the project
10. EIA approval letter.

The project developer also has to fill up an application form. This application form is a part of MD 1455.

IUKU licensing is always followed by a technical/operational commissioning/testing and also environmental commissioning/testing. The commissioning/testing will be done by independent institutions and involving PLN if the power plant is interconnected to national grid. The institutions will give Commissioning Certificate to the applicant. After the commissioning the power plant can commercially be operated.

Forms can be found in the annex.

Investment at PLN's site

Investing hydropower plant at PLN's site is possible. PLN is open for cooperation with investors either domestic or foreign. There some aspects that should be considered:

1. Cooperation with PLN's subsidiaries. Cooperation with either Indonesia Power or PJB or PLN Wilayah will make the investment process easier. The PLN Headquarter will ensure exclusivity of the project if the investor works together formally with PLN's subsidiary
2. Investment directly by the investor will have to pass a tender process. If the investor directly invests on a site without considering cooperation with PLN's subsidiaries, there will be tender process. The company has to compete with other companies. Pressure from local government and from local PLN office will not change the policy
3. In the case when the investor will do the project at a site that is already studied by PLN, there will be certain compensation for the study done. If the investment is approved by PLN and power selling contract is signed, then the compensation will be calculated based on the study expenses. Possible compensation method is by not charging PLN for the power exported to the grid for a certain amount of power
4. Buying guarantee from PLN is only for 1 year. This policy will likely change in the near future. The source in PLN could not make sure when this policy will change. The discussion of this policy is at DGEEU and according to the source from DGEEU this policy will not be available next year. In the practice the buying contract will always be more than 1 year, especially if the PLN unit in the region needs the power supply very much. The cooperation with PLN's subsidiary will not guarantee longer power buying contract (1st contract).

The fact that PLN differentiates the treatment of different investment schemes (see point 1 and 2 above) shows that PLN HQ is holding the decentralisation process. The Wilayahs are not yet independent units. All important decisions are taken at PLN HQ. This is somehow understandable because PLN, although it is a "private" company, still has the centralistic culture. It is possible that PLN's board of director will implement the decentralisation step by step to make sure that all the important aspects are ready for it.

PLN's point of view regarding new investments

Interview with PLN staff (Mr. Kabul Sutijono) showed that any investors who want to develop hydropower in Indonesia should:

1. Work with the PLN wilayah and local PLN unit to have an agreement on the hydropower development. Information such as load profile, demand, availability of resources should be collected together with local PLN officials. Having close formal and informal relationship with local PLN offices and staffs would be an asset
2. The investor should also "knock the door" of the local government or in other words introduce its presence. This is important especially to open possibilities of cooperation with local government. Local government can provide facilities such as simpler bureaucracy and land acquisition and maybe even additional investment

When all the agreements, studies, permits and also possible cooperation schemes are available then the investor should go to PLN HQ together with Local PLN representative to submit the proposal of interconnection. As stated before, a formal cooperation with PLN subsidiaries (IP, PJB or Wilayah), will affect the exclusivity of the PPA contract.

3. PLN HQ will study the proposal and if all necessary conditions are fulfilled then PLN can either give exclusive contract or open a tender process
4. In the case the PLN Wilayah does not have any money; the investor can offer cooperation to PLN HQ or other PLN subsidiaries.

This guideline is assuming that other investment procedures are followed well.

Flaws and bottlenecks in the current framework

Rural Electrification Policy

1. Clear technological choice but there is no clear funding policy. The government already showed a clear preference of energy technology. For rural electrification the government supports the hydropower and solar photovoltaic. This clear preference is not followed with a commitment to provide certain funding from government's budget (APBN) for the development of renewable energy. The government still relies on foreign aid, foreign projects, or foreign investor for the development of renewable energy.

PLN still implement rural electrification using funds from APBN by extending the grid and installing diesel generators. The director general of DGEEU has asked PLN to use at least 20% of the fund for renewable (status August 2004, source: DGEEU). This demand from DGEEU is not obligatory because there is no legal statement that binds.

For private sector this condition at one side is a good sign of government's support but at other side there is no project coming from the government. Investors who want to develop renewable energy sources in Indonesia can have political support from the government that might speed up the bureaucracy and investment procedure.

Lessons learned by private sector/investor should be informed to the government (DGEEU) so that DGEEU can prepare appropriate policy that can overcome problems and strengthen the positive practices. Private sector should always keeping close connection with government officials so that changes in the policy can be anticipated better.

2. There is no special rural electrification implementing agency, the role of supervising agency (DGEEU) is weakly executed. Special rural electrification implementing agency is not available. In the last era (electricity law 15 of 85) PLN is the implementing agency. With the restructuring of PLN this function is not available anymore (rural electrification budget is omitted from PLN's budget).

It is proved that when PLN acts as implementing agency of rural electrification; the number of electrified villages was raising rapidly. If there is no more rural electrification implementing agency; one can be sure that the progress rate of rural electrification will be smaller.

DGEEU is the supervising agency for rural electrification. DGEEU should be proactive is promoting rural electrification. DGEEU should supervise regions in implementing rural electrification. In reality DGEEU only goes to regions if there is project there. Target of

electrification rate is clear, 98% by 2020, but there is no clear target in between. Short or medium term target should be available so that DGEEU can play its supervising role.

3. Projects by the government usually do not show integrated approach and show overlapping. Example of this is the micro hydro project for rural electrification. Some government institutions such as BPPT, MOC, and DGEEU implement their own micro hydro projects. The projects are scattered all over Indonesia and really do not show any inter departmental coordination.

Overlapping is actually allowed by the general policy of rural electrification. The policy of rural electrification actually has the objective to increase the welfare of rural communities. Many institutions can use their point of view in implementing rural electrification. For example an Environmental NGO can have a forest protection project and part of the activities is hydropower installation.

There is a need to integrate all the resources available to develop rural electricity system. There should be a coordinating body if integration of resources is the aim. The seed of an independent coordinating body is already there. There is an MHP Clearing House in Indonesia. The clearing house is still new, less than 1 year old, and still not doing so much. The possibilities ahead with the clearing house are many and one of them is the coordinating body of hydropower development in Indonesia especially for rural electrification.

4. Top down project approach. Top down approach is a common approach in Indonesia. The government usually just gives something to the community without considering whether the community is prepared or not. Top down approach creates low "sense of belonging" among the projects receivers. This affects the sustainability of the projects. Often projects could not last more than 6 months after it is inaugurated.

Bottom up approach is considered taking too much time. This approach is usually applied by NGOs active in energy sector and it is proved that the sustainability of the projects is better.

For stand alone system top down approach should be applied. The combination with productive economic activities development will increase the value and success of the project. This approach will take longer time but the sustainability of the project can be guaranteed.

For interconnected project, this difficulty might not be a very important factor. Still bottom up approach is needed especially to make the project socially responsible. If the project does not involve local people, the probability to get community complaints is bigger and the people can later be violent.

5. Electricity tariff and cheap fossil energy price. Electricity tariff in Indonesia has not reached its economic level. PLN has to sell the power at lower price than the cost to produce it. This condition will eventually change in the near future as the subsidy will be omitted. High production cost is experienced especially in outer islands areas. Production cost should be lowered and this is the reason that outer island is a huge market for renewable energy because it will produce per unit energy at lower cost.

Cheap fossil fuel price is very relative. The fossil fuel price in Indonesia now is significantly lower than most of ASEAN countries, but the same price is significantly high for most of Indonesians. The historical records

Restructuring the electricity sector

6. Slow sector's restructuring process. The restructuring process is proceeding slowly. The BAPPETAL that suppose to regulate the competitive market is not yet formed. Some important technical regulations are also delayed. The condition creates longer transition period; a period without any regulation certainty.

Example of this is the IUKU issuance. Source from DGEEU confessed that they are in a difficult position because they have to issue IUKU based on the old regulation but in the near future the regulation might change and the new IUKU holders has to renew their IUKU. That means cost for IUKU holder and DGEEU does not want to do that.

The political condition makes the condition worse. The change in government structure will slow the restructuring process even slower. The new administration will need time to study the condition and there might be changes in the organisation structure also.

For big investment this condition is not very conducive. Big investment should delay their investment implementation and wait for the new administration to come. New regulations might come faster and give more benefit for their investments. This is true especially investment in competitive area.

Investment in non-competitive area might have fewer risks. The local governments are eager to install new power plants because usually those areas suffer from energy deficit. They are ready to invest and make cooperation with investors. PLN itself is also ready for new investments in outer islands. Detail regulations for non-competitive area might not be available yet, but investing in those areas is promising.

The implementation of new investments in outer islands can be accommodated by current available regulations. Regulations for non-competitive area might not change very much because it is basically still the same old electricity structure. With the restructuring delay, the decentralisation of PLN is also delayed. The investments in outer islands have to be negotiated with PLN HQ. The restructuring delay does not significantly affect new investments in outer islands.

Energy policy and related policies

7. The policy lacks of tangible targets and incentives for the development of renewable energy systems. There are no tangible targets of renewable energy policy. For example target of X Mega Watt mini hydropower plant built in year 2020 is not available. Such condition has made the renewable energy market grows slowly or even does not grow at all. The growth of the market should be driven by the government. Relying heavily on private sector does not make sense in the early stage of development.

The government will try to pass the non-fossil fuel obligation in the near future, but with the delay of the sector restructuring this policy will not come on time. It is not known how the policy will affect the market of renewable energy in the future. The effect should be very positive.

To deal with this delayed condition, investor can do two things: wait for new regulations coming or invest now. The future policy will most probably be in favour of renewable energy. There will be a fixed buying price for renewable energy power plants. The discussion is on going now (status September 2004) but there is no clear time frame when will the regulations be passed.

8. Lack of incentives for the development of renewable energy. The government always says about incentives in energy development especially renewable energy development. Until now there is no real incentive for renewable energy development. PSK Tersebar is considered by the government as an example of incentive, but the implementation is as hard as breaking rocks. There are successful PSK Tersebar projects but they are not "real" projects because intervention from DGEEU and international institutions is heavy.

Discussion about giving fiscal incentives for renewable energy developers according to DGEEU is on going. The discussion is hard because the fiscal responsibility is in the hand of other Ministry (Ministry of Finance). Compromising two different objectives from two Ministries is very hard.

Until now investing in renewable energy is considered as common investment. Fiscal incentives are given if the investment is approved by Investment Coordinating Board. The incentives are mainly reduction of import duty and income tax reduction.

Special incentive for renewable technology such as reduction or exemption of value added tax is not available. Such mechanism is already considered by MEMR, it is just the discussion to pass such incentive is very hard.

9. Funding policy is not clear. There is no incentive for local banks to involve in rural electrification/renewable development. The government can not do all the renewable energy development alone. Private sector surely has to be involved. But as the market is basically not developed, the infrastructure for private sector involvement is also not developed. Financial infrastructure for example is very underdeveloped. Commercial banks in Indonesia do not trust that investment in renewable energy/rural electrification will bring profit to their pockets.

New financing mechanism such as CDM does not attract commercial banks to involve in renewable energy development. Banks are not interested or do not understand the CDM mechanism. In some workshops or CDM training programmes very little financing

institutions that involve. Socialisation of CDM is needed including the possibilities of financing institutions involvement.

The development of rural electricity is basically still relies of foreign aid or loans. This should not be the future trend. Foreign direct investment is possible and is encouraged, but lack of incentives might be the disincentive to invest.

Legal and regulatory framework

10. The guideline for rural electrification is not comprehensive enough. The government has passed MD 064K/40/MPE/1998 about Rural Pre-Electrification. This decree only regulates the type of technology that is recommended for the implementation of rural pre-electrification. The regulation does not show who responsible for the implementation of rural electrification and who the coordinating body is etc. Actually the guidelines are scattered in many government's regulations so basically it needs an effort to collect them.

New investor would certainly walk in the dark or walk in dimmed light. There path in unclear although it is there. The government should make an effort to create a comprehensive guideline of rural electrification that includes the guidelines of private sector involvement in the programme.

Main actors in the rural electrification are PLN and MEMR (DGEEU). There is possibility that they have different perspective in the implementation of rural electrification thus the guidelines from PLN or DGEEU might a little incompatible. PLN for sure has its own regulations and those regulations are usually more detail. Asking information from PLN might be the best solution.

11. All transaction should be made in Indonesian currency Rupiah. The regulations stated that all power transaction should be made in Indonesian currency Rupiah. This condition might not be compatible with the investment made by investor. Investors, local or foreign, usually use foreign currency (US \$) to import capital goods etc. The risk of currency exchange rate fluctuation is possible. Rupiah is usually at the weak side compared to US Dollar. If Rupiah is stronger, the increase is usually not significant enough compared to the weakening.

It is recommended that the investor should calculate the investment in Rupiah at the possible worst exchange rate. Using the possible worst exchange rate will at least reduce risk of small exchange rate fluctuation during the investment period. The number will likely be very big in Rupiah but it is safer.

12. The buying guarantee is only for 1 year. PLN now only guarantees to buy power for one year. This is the common practice for small PPA contract. The number will probably be extended to at least 5 years. The discussion is still on going (status: September 2004). Long term contract is possible especially for firm capacity generation plant. The plant owner should be able to guarantee capacity to PLN to get longer term contract.

The buying guarantee time is particularly important for renewable energy power plants. Hydropower for example depends highly on seasonal condition so it can not guarantee firm capacity, unless it uses the lowest flow in the flow duration curve.

13. Implementation of PSK Tersebar (MD 1122) is still limited. Until now the implementation of PSK Tersebar is still limited. There are only 2 projects that are interconnected to PLN grid under PSK Tersebar decree. Weaknesses of the decree have made the implementation not very successful. Beside that, the socialisation of the decree is very limited. Not all PLN offices understand the decree very well and not all related institutions (such as regional government) understand their position and role.

Weaknesses of PSK Tersebar decree have discussed in the earlier section.

14. There are no comprehensive guidelines for private sector participation in hydropower development. Just like the case of the rural electrification, there is no clear and comprehensive guideline of private sector participation in hydropower sector. The current practice is very much depending on PLN's procedure especially for interconnected projects.

The procedure of PLN is actually following the government's regulations but there are PLN's internal regulations that are not know by public. Because of lack of knowledge of internal PLN regulations; Institution to institution communication can not be guaranteed. Personal approach still plays important role to pass a hydropower project. Many ways can be done to pass a hydropower project. People without any internal contact in PLN will be lost.

Basically if an investor wants to develop hydropower and interconnect to PLN; the investor can first consult to IPP contracts division under the director of Generation and Primary Energy PLN.

For hydropower that is off-grid the guidelines is less integrated. The regulations are scattered in many institutions. It needs a regulations collection effort to integrate the regulations into a guideline that is easy to understand. The institutions involved should also know their roles well. This is the responsibility of the government.

Review of Actual Projects Implemented

Overview

There are 6 examples of actual projects implemented. There are 2 successful PSK Tersebar examples and 2 not (not yet) successful PSK Tersebar examples. There is 1 commercial stand alone example and 1 example MHP developed by private sector.

Private investment in renewable energy sector is still limited. Projects that involve private sector investment are usually big projects in the scale of hundreds Mega Watts. For mini size renewable power plants PLN and its subsidiaries are the main players. PLN and its subsidiaries are active in the development of mini hydropower plants. According to source in PLN, the only privately implemented mini hydropower plants that will be interconnected to PLN are Hanga-Hanga II and Kalumpang. Those MHPs are still under construction.

Smaller hydropower plants (in micro capacity) are also relying on development aids and also the government. There are limited micro hydropower plants that are funded by private investment. The interconnections of those micro hydropower plants under PSK Tersebar regulation were not always smoothly implemented. The reasons for this are:

1. Lack of understanding of the PSK Tersebar regulation on both sides: PLN and applicants
2. There are some weaknesses in PSK Tersebar regulation that are potentially abused by PLN
3. Supports from independent aid organisation and the government (DGEEU) still are very important and decisive. Active efforts by pure private entity usually are neglected by PLN
4. Pressure on PLN from DGEEU is very important. Pressure from pure private sector is not considered by PLN (despite the obligation to buy the power)
5. Applicants usually are not actively following the process of PSK Tersebar proposal assessment
6. Sudden change in PLN's structure could create unexpected result such as delay in PSK Tersebar approval.

The success of PSK Tersebar application is heavily relying on the active role of development agencies (such as GTZ and IBEKA) and also DGEEU. Active role of pure public is not available yet, but private investment such as at MHP Salido Kecil has faced great difficulties in passing the interconnection proposal.

Development of stand alone or hybrid hydropower system for commercial use is also possible. The example from MHP Cikahuripan showed that there are some important aspects to be considered:

1. Awareness of the project owner to energy crisis
2. Availability of soft loan from either commercial financial institution or development institution
3. Active dissemination of the potential by both private sector and also development institution/consultant
4. The increasing energy price

MHP Cikahuripan provides near ideal example because it is remote; the tea plantation was 100% relying on diesel generator. The condition provides more pressure to the project owner to start the hydropower project.

Projects

MHP Kali Maron

MHP Kali Maron is located in Seloliman village, District of Mojokerto, East Java. It has now 30 kW and is interconnected to PLN grid. MHP Kali Maron was a project funded by German Embassy and Pusat Pendidikan Lingkungan Hidup (PPLH) Seloliman. The project was

implemented by Mandiri Foundation with full technical support from GTZ Mini Hydro Power Project (MHPP). The MHP was first operated in 1994.

The MHP was recently upgraded in year 2001. The upgrading was supported by GEF-SGP and GTZ MHPP. PPLH Seloliman and LEM 21 implemented the socio-economic component of the upgrading, while PT.Heksa Prakarsa Mandiri provided services of the mechanical and electrical components. GTZ MHPP provided supervision of the upgrading.

The physical upgrading components are:

1. Upgrading the mechanical and electrical component. This includes the replacement of SKAT T-12 Crossflow with the new ENTEC T-14 Crossflow turbine and replacement of old controller with new ELC (Electronic Load Controller)
2. Upgrading of the power house
3. Upgrading the distribution network to Janjing hamlet, Sempur hamlet, and PPLH Seloliman that includes the upgrading of switching station at PPLH Seloliman
4. Upgrading the intake.

The interconnection project was initiated by GTZ MHPP back in 2002. The management of MHP, Paguyuban Kali Maron (PKM), agreed with the initiative. To finance the project, PKM utilised a fund provided by GTZ MHPP. Total interconnection cost is 159 million IDR of which 51 million IDR is grant. The rest or 108 million IDR is revolving fund that has to be paid by PKM. The revolving fund of GTZ MHPP is managed by Kopenindo (Indonesian Renewable Energy Cooperative). There are conditions for the payment:

1. PKM has to pay 3 million IDR each month for 36 months starting 2 months after interconnection
2. PKM does not have to pay the interest.

The PPA between PKM and PLN is based on the MD 1122 about PSK Tersebar. According to the MD the power plant is considered as non-firm capacity power plant so PLN only has to pay for the energy charge; there is no capacity charge. The energy charge for interconnection to medium voltage in East Java is 443 IDR/kWh. The contract was signed in 11 November 2003 for the period of 1 year and extendable.

MHP Kali Maron is a "grant" type MHP power plant because the community did not have to invest unless investing their time during the construction. This type of project is common rural electrification project in Indonesia. The advantage of this site is that there are NGOs active in the area (such as PPLH Seloliman and LEM 21). The NGO build the capacity of local community to be able to manage the MHP. This has given a significant impact in the sustainability of the plant. The plant is already operating for more than 6 years before it was upgraded. The level of community involvement in the project is quite high. Giving a small share of the power plant to the nearby community will bring intangible benefit to the sustainability of the power plant.

The PSK Tersebar offering process took quite long time. The first visit by DGEEU, GTZ MHPP and PLN was made in late October 2002. PKM submitted the proposal more than half year after that first visit or on the 18th June 2003. The wide gap between was because PKM had to find source of funding for the interconnection project and also to get article of association.

PLN's approval came on 28 July 2003. PLN asked PKM to complete some of the requirements for the interconnection. PKM did not fulfil all the requirements. After the approval in hand, PKM and GTZ MHPP started to work on the interconnection preparation including the commissioning by independent institution. The contract signing was on 28 November 2003, exactly 4 months after the approval letter. This was violating the PSK Tersebar regulation that says the contract should be signed not later than 3 months after the issuance of approval letter. During that time PKM did not send any formal letter to PLN asking about the progress of the application.

MHP Kali Maron was first interconnected on the 5th of December 2003 or 13 months after the first interconnection assessment. The role of GTZ MHPP and DGEEU was very big especially in the negotiation with PLN Wilayah East Java. The result will be different if PKM did the negotiation it self. The support from the local government was not really giving much difference. As MHP Kali Maron is the first interconnected MHP under PSK Tersebar regulation, PLN Wilayah East Java might actually also active in trying to successfully implement it.

From chronology of MHP Kali Maron interconnection we can learn that:

1. Preparing all legal requirements before applying PPA to PLN is very important

2. Active role of DGEEU and also local PLN partner is very important
3. Active support from local government might also be needed
4. Applicant should be formally active in following the PPA application process
5. Application of IUKU is fast if all the requirements are all complete
6. Financing from non-profit organisation is important for small scale community based MHP development

MHP Dompjong

MHP Dompjong is located in Dompjong village, District of Trenggalek, East Java. The capacity now is 33 kW and ready to be interconnected to PLN grid. MHP Dompjong was a project funded by GoI via DGEEU back in 1994. Since then MHP Dompjong was serving villagers in Dompjong village. The project was implemented by Mandiri Foundation with full technical support from GTZ Mini Hydro Power Project (MHPP). MHP Dompjong is managed by local cooperative.

In year 2000 the PLN's grid reached the village and most of the customers changed to PLN. GTZ MHPP had the idea to interconnect the MHP in 2002. Site visit by DGEEU, GTZ MHPP and local PLN's representative was done in October 2002 right after the visit to MHP Kali Maron. The cooperative also agreed to interconnect the MHP. Upgrading was done in late 2003. Upgrading included:

1. Turbine upgrading from SKAT T-12 to ENTEC T-14 Crossflow turbine
2. Increasing the diameter of penstock
3. Controller upgrading
4. Installation of interconnection switch
5. Generator upgrading from 40 kVA to 50 kVA.

The upgrading package also includes power house upgrading. Total cost was 203 million IDR which 109 million IDR is grant from GTZ MHPP and 69 million IDR is revolving fund managed by Kopenindo. The cooperative would cover the rest of the cost. Same conditions as in the MHP Kali Maron applied for the revolving fund, expect that the cooperative does not have to pay for 3 years.

The interconnection of MHP Dompjong was actually in the same package of interconnection of MHP Kali Maron. The proposal was submitted in 14 June 2003 to PLN Kediri. PLN itself already approved the proposal by sending an approval letter on 1 July 2003. That was a quick response from PLN although contract signing is delayed more than 1 year.

PLN Kediri was having a structural change. Dompjong village that was once under the administration of PLN Kediri, now is under the administration of PLN Trenggalek. The structural change itself took very long time because many organisational adjustments have to be made. Because of this structural change, the contract signing was delayed. PLN Trenggalek is actually does not have any problem with the proposal, but the PLN Wilayah East Java office needed a formal change in the proposal.

Finally in the late September 2004, a whole new proposal was submitted to PLN Trenggalek and PLN Wilayah East Java. The recent status (October 2004) is the contract is ready to be signed. MHP Dompjong is now waiting for commissioning by independent institution in order to get the Commissioning Certificate. The MHP is not yet interconnected to PLN's grid.

The structural change within PLN was not identified before proposal submission and beyond any expectation. The condition has created a very long delay in the PPA process. This condition was not manageable by the project owner. In such condition, project owner can only wait until all the things settle down and then start all over again. Keeping good contact with PLN is also important in order to monitor the stage of changes. The experience also pointed out the importance of digging more information about local PLN's structure (both in district level and wilayah level (provincial)).

The role of DGEEU and GTZ MHPP was also very important. The last proposal submission was made by representative from GTZ MHPP and DGEEU directly to PLN Wilayah East Java. The result is not known if this effort was made by the cooperative.

From MHP Dompjong interconnection process we can learn that:

1. Digging information about PLN's structural changes is important
2. Active role of DGEEU and also local PLN partner is very important
3. Financing from non-profit organisation is important for small scale community based MHP development.

MHP Cinta Mekar

MHP Cinta Mekar is located in Cinta Mekar village, district of Subang, West Java. It has capacity of 120 kW (2 times 60 kW) and now is interconnected to PLN's grid. The project was financed jointly by HIBS (Hidropiranti Inti Bakti Swadaya) a private company focusing on hydropower development and the community. Financial support for the community came through UNESCAP from Netherlands Government. Total project cost is US\$ 169,000 of which US\$ 75,000 is considered as community's contribution. UNESCAP contribution is a grant.

The ownership of the MHP plant is 50% HIBS and 50% community. This means 50% of the profit goes to the community. The community manages the MHP with full managerial support from IBEKA. PPA agreement with PLN was reached in April 2004 with the buy back rate as much as IDR 442/kWh at medium voltage interconnection point. The PPA contract is considered as non-firm capacity contract so there is no capacity charge and contract only for 1 year renewable.

MHP Cinta Mekar is a new constructed MHP. It uses locally manufactured ENTEC T-13 Crossflow turbine. The MHP it self is also designed as a training centre for MHP developers/operators in Indonesia.

PPA process was quite fast for MHP Cinta Mekar. There are certain conditions that affect the speed of the process. According to HIBS Director, Mr. Iskandar, the track record of the company affects the PLN's decision. PLN wants to see a company that gives high priority to people's welfare not just company's profit. HIBS considers it self as such a company although this might seem very idealistic. Some people say that the smooth process of PPA for MHP Cinta Mekar was because people at HIBS and IBEKA have high level contacts at ministerial level (including the MEMR minister and the director of PLN).

According to Tri Mumpuni, the director of IBEKA, the smooth process of PPA depends on the active negotiation of the applicant. Formal and informal contacts to DGEEU and also PLN Head Quarter are very important. People from Cinta Mekar did not directly go to PLN and propose the interconnection. It was IBEKA who did the proposal preparation and all the negotiations and contacts. The role of DGEEU was actually not as big as in the MHP Kali Maron and MHP Dompiong interconnection process.

Funding from UNESCAP also came because of IBEKA's active efforts. IBEKA with the support from UNESCAP provide a model of public private partnership (PPP) of rural energy supply. As IBEKA and HIBS are actually under the same management, the involvement of private sector did not make any problem. It would be problematic if UNESCAP tried to offer this type of PPP to other private company.

Pure private company will see that such project is risky. Professionalism from the community's side might be very low and can jeopardise the whole project. The benefit of Cinta Mekar project is that HIBS and IBEKA are actually the same people. IBEKA as an NGO is in the position to build the capacity of local people at "no cost" to HIBS. This condition significantly reduces the risk of the investment.

The project would be more realistic if a "pure" private company works together with local people.

From MHP Cinta Mekar project we can learn that:

1. Private equity is the last option for private investment. Local commercial fund is not available
2. Share of ownership will reduce the social risk and environment risk
3. High level connection is needed to pass easily a PSK Tersebar proposal or any other PPA proposal
4. PPP mechanism is possible in Indonesia as long as there is a party who is responsible to increase the capacity of local people.

MHP Cikahuripan

MHP Cikahuripan is located at Dewata Tea Plantation, district of Bandung, West Java. It has capacity of 250 kW (2 times 125 kW) and provides power to the tea factory and workers' housing. Financing of MHP Cikahuripan was from PT.Chakra and Soft Loan from USAID. Total project cost was US\$ 320,000 of which US\$ 160,000 is PT.Chakra's equity and the rest is soft loan from USAID. The soft loan from USAID has grace period of 2 years and annual interest of only 6%.

The project was supported by a Swiss engineering company ENTEC, GTZ MHPP, JAMP (Joint ASEAN Mini-hydropower Project), and YBUL (Yayasan Bina Usaha Lingkungan). JAMP channelled the Swiss contribution to the project especially for the preparation of Feasibility Study back in 1999-2000. YBUL helped the project in channelling the soft loan from USAID. GTZ-MHPP supported the feasibility study and also the engineering process.

MHP Cikahuripan implemented some of the state of the art technologies in mini hydropower such as:

1. ENTEC T-15 Crossflow turbine
2. ENTEC Digital Turbine Controller (DTC-VARIO).

MHP Cikahuripan is operated with a diesel back-up. The objective of the project was actually to reduce the dependence on diesel generator. Diesel generator only operates in the dry season for a short time. MHP Cikahuripan was first operated in December 2002.

The condition that boosts the implementation of the project was the energy price policy of the government. Dewata tea estate was relying on diesel generators to power the tea production process and also give electricity to the housing facility. As the diesel fuel price increases the cost of the operation also increases. This condition has made the products from Dewata Tea Estate less competitive because of high production cost.

The feasibility study done in 1999-2000 showed that energy cost for standalone diesel generator was about IDR 400/kWh. The actual condition showed different thing, it costs higher about IDR 600/kWh. This has made PT.Chakra agreed to develop its hydro potential. The role of GTZ-MHPP and JAMP was very big to ensure project owner that the project is financially and technically feasible. The economic feasibility of the project was calculated using avoided diesel cost. As the diesel fuel price is increasing and will increase in the future; the project will be even more feasible economically. This condition should attract financing institutions to finance renewable energy projects.

JAMP was also playing important role in connecting PT.Chakra to YBUL. YBUL as the facilitator of soft loan agreement was successfully did the facilitation. PT.Chakra got the soft loan from USAID with 2 years grace period and 6% annual interest.

PT.Chakra as the project owner played the most important role. PT.Chakra as a private company decided an important decision to build the MHP. It is a rare condition that a private company (that is not an energy company) decides to build an MHP facility. The promising feasibility study done by ENTEC and also energy situation in Indonesia (energy price) were able to convince PT.Chakra to build the MHP plant.

The location of the tea plantation that is surrounded by protected forest provides another reason to develop MHP. The protected forest surrounding the location will ensure the continuity of water supply so that the project can have longer life span.

The geographical, financial, and political conditions were perfect at that time for an MHP development. Time spent to convince PT.Chakra was not short. It took more than 1 year to convince PT.Chakra to decide building the MHP plant, but as the commitment was there, the work left was just choosing the optimum solution.

The success of MHP Cikahuripan has given a good example of private participation in renewable energy development; this is also a good example of utilisation local resources. GTZ-MHPP together with PT.Chakra always promotes the success so that it can be replicable at other tea plantations. But still the feedback from other tea plantation was not as good as expected.

From the case of MHP Cikahuripan we can learn that:

1. Project owner should understand the energy condition in Indonesia now and in the future

2. Project initiator/consultants should understand very well the energy condition in the future and present it realistically and convincing
3. Government policy directly affects the energy related decisions. This shows that the role of the government is very big in creating renewable energy market. Small increase in energy price should effectively affect the efforts to conserve energy and use new energy source
4. The awareness of private sector (industrial sector) to utilise local resources is still low although a good successful example is already available. Financial capability might be the reason because (especially for tea producers) tea product from Indonesia is globally in weak position now
5. Availability of soft loan financing is also a decisive factor. Government should encourage financial institutions to provide soft loan
6. Active role of government and also other international institutions/projects is needed in disseminating the success of the project.

MHP Salido Kecil

MHP Salido Kecil is located in Salido Sari Bulan village, district of Pesisir Selatan, West Sumatra. Total installed capacity is 1050 kVA but the generating capacity is only 350 kVA (status: September 2003). The configuration of the MHP is 3 pelton turbines @ 350 kVA each and only 1 is in good condition. The MHP was first operated in the 1910s by Dutch colonial. Right now only about 70 KW of the generating capacity is utilised to power adjacent ice factory. The owner of the MHP is a private company named PT.Anggrek Mekar Sari (AMS).

MHP Salido Kecil has supplied electricity to Painan, a nearby town 12 km from Salido, since 1980. The power selling is based on some PPA agreements between AMS and PLN:

1. Back in 1980 according to Contract No. PJ/134/PST/1980 with buy back rate IDR 10/kWh
2. In 1981 buy back rate was increased to IDR 12/kWh
3. In 1984 buy back rate was increased to IDR 18/kWh
4. In 1989 buy back rate was increased to IDR 23/kWh and
5. Until 1996 the buy back rate still at the same rate IDR 23/kWh.

Since 1996 PLN cut the PPA contract with AMS because of new grid extension to Painan. Due to recent energy crisis in West Sumatra, PLN is willing to again interconnect MHP Salido Kecil. The problem is the interconnection infrastructure is not in good condition now.

Plan to re-interconnect MHP Salido Kecil to PLN's grid was started back in 2001 when PLN sent a team to assess the technical feasibility of interconnection. Bad condition of the turbine and all the supporting control has made PLN delay the interconnection process because PLN did not want to invest in the rehabilitation of MHP Salido Kecil.

AMS it self does not have enough financial capability to rehabilitate the MHP. AMS's income since 1996 is relying on selling ice to the fishermen and the income is not enough to finance the rehabilitation. The most important and costly upgrade is the rehabilitation of the pelton turbines. Prospect for interconnection did not attract commercial funding. This condition has attracted ENTEC AG to invest and in January 2004 ENTEC AG produced a feasibility study of MHP Salido Kecil upgrading.

It is planned that ENTEC AG will be the financing partner of AMS. ENTEC will invest to finance the project and there will be income sharing between ENTEC and AMS. This scheme is like BOT (Built Operate Transfer). The difference is just the power plant will not be newly constructed. There will be a contract between ENTEC and AMS. ENTEC will use its own equity for the investment. The new electricity law opens the possibility for foreign company to make cooperation with local company to sell electricity.

The proposal of interconnection under PSK Tersebar regulation is already submitted to PLN Wilayah III West Sumatra in early 2004. A presentation was already made in front of PLN Wilayah III management in May 2004. All requirements to apply PSK Tersebar are already fulfilled by both AMS and ENTEC AG.

After the presentation, the ball should be in the hand of PLN Wilayah III. PLN should send a letter of approval/non-approval to AMS, but until now (status: September 2004) the letter is not coming. It is already more than 4 months and it is already more than the MD 1122 says (3 months max). Since PSK Tersebar does not say anything if PLN does not send any approval letter, then AMS and ENTEC could not do anything. There is no information from PLN on why the process stops.

AMS and ENTEC already contacted DGEEU in order to get support. The project is fully supported by DGEEU but still there is no sign from PLN Wilayah III. Contact with local government has been done many times by AMS but the result is the same. Support from local government does not make the condition change.

Since there is no positive sign from PLN, the rehabilitation of the power plant is delayed.

From the case of MHP Salido Kecil we can learn that:

1. PLN will not invest of additional network to connect a power plant even when PLN needs the power very much
2. The private company could not get commercial funding although the prospect of interconnection with PLN is available
3. Private to private cooperation is possible and encouraged by the government
4. PLN Wilayah needs a capacity building to be able to approve interconnection proposal that is profitable for PLN it self.

MHP Hanga-Hanga II and Kalumpang

MHP Hanga-Hanga II and Kalumpang are located in Luwuk, district of Banggai, Central Sulawesi. The potential capacity of MHP Hanga-Hanga II is 2.5 MW while potential capacity of MHP Kalumpang is 1 MW. Both MHP are now still in construction phase. The owner of the MHPs is PT.Buminata Cita Banggai, a joint venture company between PT. Buminata Aji Perkasa, PT. Cita Contract and Local government of Banggai.

Both sites are actually PLN's site. Those sites are two of 15 sites identified for IBRD/World Bank project. The construction of MHP Hanga-Hanga II and Kalumpang is financed by IBRD/World Bank. Overall cost is estimated at around IDR 33 Billion or more or less US\$ 3.7 Million. Buy back rate from PLN is proposed to be IDR 450/kWh. As the fund is coming from World Bank, this project is not 100% private investment.

According to source in PLN (Mr. Imam Santoso), this project is quite problematic. He said that, insider in PLN has made a personal business out of this project. He said that there is no formal permission to use the feasibility study so PLN's board of director was quite disappointed with the outcome.

Information from IBEKA (Mrs.Tri Mumpuni Iskandar) showed that the project owner has to spend unnecessary expenditure to have the feasibility study of the site. This information showed that insider in PLN has made a personal business of this project.

From MHP Hanga-Hanga II and Kalumpang we can learn that:

1. It is possible for private company to access loan from IBRD/World Bank
2. Cooperation with PLN's subsidiary would make the project less problematic especially for PLN's side
3. Formal contact to PLN is very important although personal approach to insider in PLN might be very effective
4. Cooperation with PLN's subsidiary will make the project less problematic at least from PLN's point of view
5. Corruption is everywhere, project developers should be prepared

Existing Private Sector Business Structures for Rural Energy Services

Guidelines of Private Sector Involvement in Rural Electrification

Modalities

There are some forms commonly applied in private sector involvement in rural electrification. Those are:

1. BOO

Build Own and Operate scheme is commonly applied in Indonesia. Private sector works in remote rural areas providing small diesel generators usually applies this scheme. Off-grid scheme is mostly totally private financed and does not have anything to do with PLN. There are no rules for those very small power producers.

In bigger scale BOO is also applied to mini power plants interconnected to PLN's grid. Using LTRA (Long Term Rental Agreement) the private sector provides the power plant while PLN provides the fuel. This is practiced for most of the diesel generators rented by PLN from private sector. Although it is called Long Term Rental Agreement, in practice the contract is only for 1 year and extendable.

Bigger capacity power plants can also use the scheme. For domestic investment there is no limit of investment period (30 years for foreign investment) so the investor can always own the power plant and sell the electricity to PLN using IPP contract. The process to get IPP contract might take very long time but the investor can always get a long term buying guarantee.

For foreign investor it is possible that as soon as the payback achieved the BOO scheme is shifted to BOT scheme. The age of the power plant might increase the operational cost and reduce the profit. The problem might come up in the transferring process. PLN or any investor might not agree with the price offered by the investor, unless early in the beginning there has been an agreement on price for handing over.

2. BOT

Build Operate Transfer scheme is also possible. Usually this scheme is applied for mini to big power plant capacity. It is usually applied when the investor has a firm capacity contract to PLN. To ensure the power plant reaches its firm output the investor which should know the technology better, will operate the power plant. Very small private power producers in remote areas usually do not apply this scheme.

The PPA contract might also include the time frame when the investor should transfer the operational responsibility to other party (PLN). It is possible that when PLN has a share in the investment, a BOT scheme is applied. There is no rule on the transfer time; it is all depend on the negotiation with PLN.

3. BOOT

Build Own Operate Transfer is also possible to be applied. This scheme will finally transfer the ownership and also operational responsibility to PLN. In this scheme it is possible that PLN does not have any share in ownership. The contract will probably be an IPP contract.

Guidelines

There are some basic issues in the participation of private sector in rural electrification:

1. Deficit areas. Energy deficit areas will be the first thing to look. It does not make sense, in the short term, to invest a power plant in an area that already has enough energy. Deficit areas are most probably in outer islands. Identification of those areas is important first step. Type of generation should follow the future trend in the energy policy. Energy policy in

Indonesia will slowly in favour of renewable energy. Renewable energy obligation will most probably applied by 2020 (5% of total generation capacity)

2. Local government's policy in rural energy service. Local government will play important role in rural energy service. It is possible that local government intends to build its own network not interconnected to PLN's grid. It is also possible that local government will invest on generation to supply energy to rural communities. The investor should look for this possibilities
3. PLN's interests. In deficit areas, PLN's capability to provide energy is limited. Private sector involvement in power generation will be accepted very gladly. Intense approach to PLN is required especially with its subsidiaries such as Indonesia Power or PJB
4. Energy demand in the area

General guidelines for private sector involvement in rural electrification (more detail in Legal, Regulatory and Fiscal Framework chapter):

1. The private sector should be a legal entity established based on Indonesian Law. A PT (perseroan terbatas) is needed. Foreign company should make a PT in Indonesia
2. All necessary taxation requirements should be available; for example Tax Payer Identification Number (NPWP)
3. All necessary information about deficit areas should be gathered. This is also a chance for the investor to approach PLN at Head Quarter level. The director of generation and primary energy can be contacted. DGEEU can also be contacted especially to give guidance on rural energy implementation
4. All necessary information about the rural energy policy in local government level should be gathered. The investor should know which pathway the local government might take to provide energy for rural community. The discussion can be done directly with Provincial/District Head or with the Regional Development Planning Board (BAPPEDA). The following questions should be answered.
 - a. Is it off grid solutions or on grid solutions?
 - b. Are there any possibilities for local government to invest?
 - c. What can the local government do to support private investments?
 - d. What can the private sector do to support the policy?
 - e. What kind of cooperation provides best win-win solution?
5. All necessary technical and non technical information of local PLN's system should be gathered. Close contact with the PLN's Area Manager should be done. Contact at PLN Wilayah is necessary in order to introduce the objective of the investor. Possibilities of cooperation with PLN should be explored because it will make the negotiation at PLN HQ level easier. Current energy demand and also the projection of energy demand should be understood very well. Information from local PLN office is needed
6. A memorandum of understanding between three parties (Investor, PLN, and Local Government) should be produced to be the foundation of future cooperation. In the MoU there should be detailed rights and obligations of each party. The implementation of MoU can be in the form of new company (a PT) with shareholder from investor, PLN and local government
7. The consortium should draw a development plan together
8. After the MoU is signed, especially the investor and the local government should inform DGEEU about the future plan. This is important step in order to have supportive actions from DGEEU
9. All the necessary studies (technical, financial, demand) and environmental impact assessment should be done. The study will reveal how much the investment is needed
10. The investor can directly register the investment to investment board to get approval. This step can use the help from local government
11. With all the already available studies investor with local PLN representative should discuss further investment and PPA possibility with PLN HQ. PLN HQ will usually see the technical requirements of the investment, and also the existence of cooperation with PLN's subsidiary.

Cooperation with PLN's subsidiary will make the PPA processing easier because the site will exclusively be given to the investor. If there is no cooperation with PLN's subsidiary, PLN has to make a bidding competition

12. If PPA contract is approved, the investor can start to apply for IUKU license (License of Power Generation for Public Interest). If the power plant is on grid then the approval of IUKU will be given by Investment Board (if the investment is approved by Investment Board). If it is off-grid then the IUKU will be issued by local government
13. The construction of power plants and maybe all necessary transmission and distribution network can be done. All licenses useful for the construction should be issued by local government via the appropriate offices
14. Before connecting to PLN's grid an independent commissioning team should check the power plant and all important components and then issue a commissioning recommendation/commissioning certificate
15. Finally the power plant can operate and supply the energy.

Issues and Barriers to Participation

1. Financial. Commercial financing for rural electrification is not available in Indonesia. Banks considered rural electrification as "charity" type project that is not profitable. Local banks are not interested in financing private rural electrification projects. Export credits also need local bank guarantee that will also finally increase the cost.

Rural electrification is very much relying on government's budget and also development aids. Such fund can only be accessed by states enterprises (i.e. PLN). Private sector should have enough equity to participate in rural electrification

2. Complex bureaucracy. Complex bureaucracy in many institutions has created certain disincentive because it creates high cost. There is no clarity about the guidelines and it seems that any approach can do well
3. High unnecessary costs. It is true that unnecessary cost or "ghost expenditure" in Indonesia is quite high. This happens at almost every institution including PLN and local government offices. High ghost expenditures obviously increase the investment cost
4. No significant incentives from the government. Investment for rural electrification is not prioritised by the government. Export oriented investment will have high priority treatment from the government. This condition has made certain disincentive for new investments in rural electrification
5. Low energy absorption in rural areas. Low energy absorption will create a low power plant capacity utilisation and increase operation cost. Off grid system needs a high capacity utilisation in order to make the investment feasible. In on grid system this problem might not be very influencing
6. Monopsony market. The market is actually not 100% monopsony (single buyer) but now PLN is the only possible buyer. PLN has stronger negotiation position than investor. PLN can affect the power buying price and determine the PPA contract period
7. Social issue. People in rural areas are sometimes very sensitive with negative issues about new investment. It is often that they are afraid that they will not get the right amount of compensation (due to corruption) etc. Such issue is very important and sometimes can create violence. Social issues especially about compensation should be carefully taken care of.

Actions to mitigate or eliminate the barriers

1. Financial. Private investor is recommended to cooperate with local government and also PLN's subsidiary so that financial capacity for the project can be increased. Foreign investor bringing direct investment in Indonesia is also encouraged to work together with local government and also PLN
2. Complex bureaucracy. The investor should contact directly the "head" of the institution and ask the proper bureaucracy. Head of the institution should be able to show the proper

bureaucracy. Cooperation with the institution (for example local government) will also make bureaucracy easier

3. High unnecessary costs. This might be hard to avoid. The practice can only be reduced. It is advisable not to use PLN's study (site feasibility study) because it is often that there are persons in PLN make a business of it. Cooperation with PLN's subsidiary might also reduce the possibility of such practice. Cooperation with local government can not guarantee that it will be clean from "ghost expenditure". The government officials might ask for facilities (travel, hotel, etc.) from the investor
4. No significant incentives from the government. There is nothing the investor can do about this. One thing that might be useful to be done is registering the investment to the investment board and formally ask for supports from DGEEU
5. Low energy absorption in rural areas. For off grid systems, the development of power plant should be part of bigger project i.e. development of economic activity project. This means for such projects the financial source should come from development agencies (ADB, World Bank etc.). Economic activity, especially industry, will increase the capacity utilisation and increase income of the power plant
6. Monopsony market. It is unavoidable that right now PLN is the only electricity buyer especially in non competitive area. The development of new distribution companies will only happen in competitive area. The government policy will surely change. Contract for renewable energy power plant will be longer than 1 year. Other solution to create new market is possible and the electricity law already accommodates. Off grid system and development of local grid are some examples
7. Social issue. Bottom up approach is the key. The approach can use the expertise of local NGOs. NGOs can build understanding among the rural communities about the project so that there will be no suspicions. The problems with this approach are finding the trustworthy NGO and time taken for such process.

Opportunities for Accelerating Renewable Energy Application for Grid Connected Power Generation

There are at least 5 driving forces of the acceleration of renewable energy application for grid connection:

1. Changing policy of PLN due to PLN's restructuring. PLN is willing to invest some money for hydropower development and inviting private sector to join
2. The Electricity Law gives responsibility to local government to provide electricity. Many areas need power urgently and local governments are more than willing to invest in power generation particularly by hydropower
3. Changing policy in energy sector. Increasing energy price and the future renewable energy obligation shows a fact that the government is in favour of renewable energy
4. Opportunities for private sector to access soft loan from development agencies
5. Full support from energy authority (DGEEU) on grid connection of renewable energy power plants.

PLN changes the investment policy and starts to invite private sector to invest in hydropower development. This policy is actually strengthening the "pseudo monopoly" of PLN especially in non-competitive area. The reason for this is that almost all potential hydropower sites are already identified by PLN. With all information in hand PLN can invite anybody who wants to invest. Cooperation with PLN guarantees an exclusive contract for the investor and guarantees the return of investment.

Local governments play important role in electricity sector under the new Electricity Law. Local governments especially in outer islands are more than willing to invest on a new power plant because of high energy demand. Investors can always make joint ventures with local governments. Cooperation with local government will guarantee at least basic licensing problems and also land acquisition problems. Approaches to local community can also be done more effectively.

Local governments are accustomed to the application of renewable energy applications especially micro hydropower and solar home system. Investor would have to be able to ensure the local governments if new renewable technology will be installed.

Energy policy is changing although detail technical regulations are not complete and there is lack of tangible targets. The government has always made renewable energy as the priority and has showed commitment to it. PSK Tersebar decree, future renewable obligation, and also fix buy back rate for renewable energy are some of the commitments.

Financing renewable energy projects is always a problem. Commercial fund is not available from commercial banks. Export credit is possible but normally will increase the administration cost. Financing from the government can not be expected. The last possible sources are private equity or soft loans from international development institutions. Soft loans from international development institutions are available also for private sector. This is a good chance for private sector to involve in renewable energy development.

Formally DGEEU will always support the effort to interconnect renewable power plants. In the early stage of PSK Tersebar implementation the role of the DGEEU is very important. For mini capacity interconnection the role might be less important, but still it is not negligible. DGEEU as the government shows the commitment of renewable energy development

Conclusion and Recommendation

Conclusion

Electricity sector in Indonesia is being restructured now. The restructuring has been slowly implemented and delayed due to some reasons. Delays have made important regulations are also delayed. This has made uncertain condition in the level of electricity business players. There will be two kinds of markets: competitive market and non-competitive market. Both markets are not there yet.

The new policies in electricity sector support the development of renewable energy and in favour of renewable energy. The role of government in rural energy supply is still very important although private sector is also encouraged to involve. Due to lack of detail regulations and local financial sources, the involvement of private sector in rural energy supply is not as good as expected.

Supports to renewable energy also seem only political. There is no tangible target of X Mega Watt of hydropower installed by year 20XX or X Mega Watt of Geothermal plant by year 20XX. The government is failed to develop the market. Despite the failure the government still tries to improve the market by planning to pass renewable energy obligation policy and fix buy back rate for renewable energy. The future of renewable application is actually bright in Indonesia.

To finance rural energy supply/renewable energy projects funds from local commercial financial institutions can not be guaranteed. Local financial institutions are not able to see the profit of financing renewable energy projects or rural electrification. Financing rural electrification/renewable energy project still relies on either foreign aid or government's budget.

Regulatory framework that supports the involvement of private sector in rural energy supply/renewable energy development is actually available. There are no special incentives for such involvement. The government still tries to improve the incentive package for such involvement although it maybe very hard because incentives are given mostly to export oriented industry not power industry.

The guideline for private involvement is quite complex and involving many institutions both in local and central level. The complexity of the procedure might reduce the willingness of investor to invest in energy sector. PLN's policy to prioritise its subsidiaries also creates disincentive for new totally private investments. Despite of the complexity, private sector is encouraged to invest in power generation for rural energy supply.

Opportunities for private sector are still available. Funding from international development institutions is now accessible by private sector. CDM as one of important funding mechanisms should be explored more. Involvement of local government in the investment also can reduce the financial burden from the shoulder of private investors. The solution is not always "interconnection". Off grid system with totally independent tariff system is possible under the new electricity law.

New government brings new hope of change. It is hoped that new government is able to reduce corruption in every aspect of the business. It is hoped that new government is able to reduce social restless. It is hoped that new government will be able to accelerate the restructuring of power sector.

Recommendation

Current sector's condition is still conducive for new investments. PLN already opens new opportunities for private investment. Old regulations can still be applied and future regulations will likely simpler and provide better investment atmosphere.

New investor should work closely with local PLN office and also local government. Total understanding between parties involved is needed so that power investment plan can be implemented smoothly. Cooperation with PLN's subsidiary will guarantee better chance of investment payback.

Investing renewable energy applications now will surely get the benefit in the future. Fix buy back rate will ensure better cash flow and when the renewable obligation is practiced, the investor is ready.