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D3 - Overview of policies

Policy review document including summary of stakeholder interviews

Indonesia

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Final draft

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Executive Summary

This report provides a detailed overview of the current status and the existing policy initiatives in Indonesia that are most relevant for the RENDEV project, i.e. with regard to micro finance and solar energy. The report is complemented with three case studies providing detailed information on the nature and set up of the earlier programmes.

The infrastructure and expertise with regard to micro finance is largely available in Indonesia, and the expertise which was built through the former solar programmes should facilitate the design and implementation of new and ongoing programmes.

Still, the key observation is that none of the approaches applied thus far to increase the use of solar energy has been very successful, because of various reasons. The government project has mainly failed due to the lack of ownership of the SHS, as well as poor quality and maintenance of the systems. As for the private initiatives the insufficient number of creditworthy end-users proved a key barrier. This is to a large extent due to the socio-economic reality (i.e. high poverty levels), but the situation is worsened by the inherently scattered nature of communities in the remote and geographically diverse areas throughout Indonesia. Furthermore the government and private programmes running in the same areas seemed to have weakened rather than strengthened the respective initiatives. An alignment of programmes or joining of both forces could help in overcoming many of the observed barriers.

The approach which proved very successful in Bangladesh, i.e. the REREDP project ran by the semi-public finance institution IDCOL with funding from the World Bank, can be used as inspiration when designing and implementing future or ongoing initiatives. An inherent difference between the two countries though remains the density in population. In the case of Bangladesh the high density makes it relatively easy and cost-effective to maintain service centres in the field, whereas this would be much more costly in the case of Indonesia with its remote communities scattered over the archipelago's many islands. A focus on community systems rather than on household level systems therefore seems appropriate for Indonesia, i.e. mini-grids using solar energy and/or hybrid systems using solar and diesel or biodiesel. In addition small and medium sized companies should be targeted, aiming to link the provision of (solar) energy more closely to income generation and improve the socio-economic situation of poor(er) people.

Before the above ideas can be put into practice some structural aspects should be improved. A primary aim for any programme should therefore be:

- To launch a coordination process between the different government ministries and agencies running PV programmes;
- To launch a planning program regarding extension of the grid, as well as a detailed resource assessment of the solar and other RE potentials in order to prioritise those areas where the use of solar energy (and minigrids in general) is the most appropriate solution.

The aim throughout the RENDEV project's communication activities will be to integrate the formulated conclusions and recommendations in the development of adequate toolkits for efficient solar energy end use. These toolkits will be tailored to the specific rural contexts of Indonesia, and applied (ideally as part of an existing program) in a defined area where people can be trained using solar energy or hybrid energy systems.

The new approach which is currently being developed by BPPT through Masyarakat Energi Terbarukan Indonesia, the Indonesian Society of Renewable Energies (METI) may integrate some of those elements. The new approach will cover both individual and grid connected systems as part of a national PV program, but more detailed information about the programme is not available at this point in time. Wherever possible and feasible within the time frame of the project, the RENDEV activities should support and strengthen this new approach.

This report has been produced based on desktop research combined with first hand information collected during the one week visit of the RENDEV project team to Indonesia in January 2007, during which consultations and interviews with key stakeholders (including government institutions, microfinance institutions, system suppliers, research institutions, local authorities) took place. The report of this mission is added in Annex 3 of this report.

The RENDEV project team wishes to thank all the stakeholders who were kindly willing to share their views and experience.

List of Abbreviations

BPPT	Indonesian Agency for the Assessment and Application of Technology
ESDM	Indonesian Ministry of Energy and Mineral resources
GEF	Global Environment Facility
GHG	Greenhouse Gases
GOI	Government of Indonesia
LGED	Local Government Engineering Department
MDGs	Millennium Development Goals
METI	Masyarakat Energi Terbarukan Indonesia (the Indonesian Society of Renewable Energies)
NGO	Non-governmental organization
NTT	Nusa Tenggara Timur (an Indonesian province consisting of circa 550 islands)
RES	Renewable Energy Sources
RES-E	Electricity generated from RES
Rp (IDR)	Indonesian Rupee, national currency in Indonesia (\$1 is about 9100 Rp)
RET	Renewable energy technology
SHS	Solar Home Systems
UNDP	United Nations Development Programme

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I. Introduction

This document will focus on the current status, trends and evolutions in Indonesia in those areas which are most relevant for the RENDEV project, i.e. Poverty Reduction Strategies, Micro Finance and Solar Energy.

This exercise will demonstrate if and how the links between these different areas are established and could be improved, where the potential for future policy development might lie and which barriers are to be reckoned with in each sector.

This report has been produced based on desktop research combined with first hand information collected during the one week visit of the RENDEV project team to Indonesia in January 2007, during which consultations and interviews with key stakeholders (including government institutions, microfinance institutions, system suppliers, research institutions and local authorities) took place. The RENDEV project team wishes to thank all the stakeholders who were kindly willing to share their views and experience.

Finally the formulated conclusions and recommendations will feed into the further process of the RENDEV project, in particular in developing adequate toolkits for efficient solar energy end use, which will be tailored to the specific rural contexts of Indonesia.

II. Background¹

Indonesia is an archipelago consisting of about 17,000 islands, around 6,000 of which are inhabited. The majority of the population (80%) lives on two islands; Java (59%) and Sumatra (21%). The other main islands are Kalimantan, Sulawesi and Irian Jaya, apart from 3 smaller archipelagos, Maluku, West Nusa Tenggara (NTB) and East Nusa Tenggara (NTT).

Mainly due to economic growth and increase of population Indonesia's energy consumption has been growing rapidly. The primary energy demand was met primarily by oil, followed by natural gas. Renewable energy still contributes only a minor share.

Pertamina is the state owned oil and gas company. Pertamina's business consists of oil, gas and geothermal energy exploration and production in the upstream sector; processing, marketing, trading and shipping in the downstream sector. Perusahaan Listrik Negara (PLN) is the state electricity company and Indonesia's only utility company.

By 2004 the installed capacity of PLN had reached about 25 GW from all generation units across Indonesia. The shares per type of generation are as follows:

- Hydro Power Plants 3,184 MW
- Oil-fired Diesel Power Plant 3,073 MW
- Steam Power Plant 6,800 MW
- Gas Turbine Power Plant 1,748 MW
- Combined Cycle Gas Turbine Power Plants 6,241 MW
- Geothermal Power Plants 380 MW

In 2004 Indonesia generated 112.6 billion kilowatthours of electricity, of which 86 percent came from conventional thermal sources (oil, natural gas, and coal), 10 percent from hydroelectric sources, and 3 percent from geothermal and other renewable sources.

Historically Indonesia has been maintaining fuel consumption subsidies resulting in products being sold below world market prices. After petroleum prices were modestly increased (partly due to international pressure), a sharp decrease of subsidies was put through in September 2005, with retail gasoline and diesel prices rising by an average of 125 percent as a result. Still, fuel consumption subsidies take up a sizeable portion of the government budget.

The liberalization process of the downstream oil and gas sector in Indonesia has been slow. Although licenses for retail sale of petroleum products were granted to foreign companies (including BP, Shell and Petronas) national company PLN maintains a dominant position in Indonesia's downstream sector, operating all eight of the country's refineries. Retail market competition is scheduled for 2008, when power producers will be able to sell directly to their customers rather than through PLN.

Due to the weakness of the oil sector the country depends on imports, even despite the significant national reserves. Being aware of the strategic importance of the increasing demand for oil, Government of Indonesia's (GOI) Decree 5/2006 aims to provide a framework to tackle the challenge and is designed around two key elements and targets:

¹ Country Analysis Indonesia, EIA; Country Review Indonesia, PREGA; Ministry of Energy and Mineral Resources Indonesia

- Improved energy efficiency: as from 2025 the national energy consumption should not increase faster than the economic growth;
- A shift in the energy mix: as from 2025 the oil dependence should be below 20%; the suggested alternatives for oil are primarily coal, gas, possibly nuclear, bio fuels and geothermal.

One of the major obstacles to increase power generating capacity though is pricing. The government sets the price at which PLN sells electricity in the country, and since the Asian Financial Crisis, it has often had to sell electricity at less than the cost of production. PLN's financial difficulties, coupled with its inability to increase power prices, have prevented the company from investing in new infrastructure projects to build up capacity.

In September 2002 the government passed new legislation aimed at strengthening regulatory guidance in the power sector and promoting new investment in power projects. The so called "10,000 MW Acceleration Program" was developed to expand generation capacity with 10,000 MW by 2010. Finally, according to the 2002 Electricity Law, certain markets for power generation are open for competition from 2007.



Figure 1 Map of Indonesia – Source: Lonely Planet

Inhabitants	245 million
GDP per capita	3500\$
People living in rural areas	54.47%
People living on < 2\$/day	55.3%

Table 1: Key figures on Indonesia

Electricity production (2004)	120.2 TWh
Electricity generation capacity (2004)	25218 MW
Electricity consumption (2004)	105.4 TWh (demand growing by 8% per year)
Electricity consumption per capita	415 kWh/year
Electrification rate (2006)	56%

Table 2: Key figures on electricity in Indonesia

In 2004 about 123 million out of 217 million of the total Indonesian population were living in rural areas.² Despite the fact that they comprise of more than 50% of the total population, there is still wide disparity between rural and urban communities. This situation presents a huge challenge for Indonesia to meet the Millennium Development Goals, one of which is to eradicate extreme poverty and hunger³.

Following this situation, The Government of Indonesia (GOI) has developed several programs covering various subjects such as education, health, agriculture, drinking water, small and medium scale industries, and electricity.

GOI has recognized that an adequate, reliable, fair and environmentally sustainable electricity supply at an affordable price is a vital ingredient in the modern economy, as it is an essential input for both economic (i.e. the production of goods and services used by households and businesses) and social development. Therefore GOI determines the target to increase the electrification rate to 90% by 2020.⁴

The current ratio of electrification in Indonesia has been defined by various institutions, the results varying from 57% (based on data from PLN, the state-owned Electricity Company) to 88% (based on a survey conducted by BPS, the National Statistics Agency). In any case this means there are around 70 to 90 Million of the population without any electricity access.⁵

Renewable energy – Opportunities and Barriers

Photovoltaic energy (PV)

At an average solar irradiation of 4.8 kWh/m².day, the potential for PV in Indonesia is very significant. This document will focus primarily on PV, the respective potentials for other renewable energy (RE) sources are described below and presented in Table 3.

Biomass and bio fuels

The main sources for biomass are wood (from rubber and palm tree plantations), and crop residues (from palm oil, sugar and rice processing). There is a critical sustainability issue though when it comes to large scale bio diesel production by corporate (Indonesian or foreign) companies and the destruction of tropical rainforests that comes with it, e.g. in Sumatra and Kalimantan. This evolution is triggered by the 2006 decree targeting bio fuels to cover 5% of national primary energy demand by 2025, and by international developments (e.g. the EU target for more biofuels, which has been changed exactly because of the sustainability issues, as well as through the potential impact on food prices).

Wind

Despite electricity from wind energy being economically viable in several locations, there are no immediate plans to move wind energy forward, apart from some specific cases, i.e. small turbines on small islands.

Geothermal

Bearing in mind that Indonesia is located around a centre of volcanic and tectonic activity, the potential is enormous. With a mere 380 MW currently being installed (equaling about 3% of the total power generation) only a fraction of that potential is being used.

² Welfare Statistics 2004, based on National Socio-Economic Survey, BPS, 2004

³ See www.un.org/millenniumgoals

⁴ DESDM, Blueprint for Development of National Electricity Industry (2003-2020), 2003

⁵ RPTL (The National Power Generation Plan) 2004-2013, PLN, 2004

Electricity from geothermal power can be generated relatively cheap (7-8 \$ct/kWh), given the widespread availability at relatively low depths. This is still more expensive than coal (4.5 \$ct/kWh), which is used as a benchmark and currently provides 33% of Indonesia’s electricity generation.

The Asian Development Bank (ADB) financed a Geothermal plant (Lahendong II – North Sulawesi) under the REDS (Renewable Energy Development Sector). The 20MW geothermal steam turbo generator plant is being operated by PLN and will deliver up to 158 GWh of electricity annually. The geothermal field is owned and developed by Pertamina who has a agreement with PLN. The project is located on the existing Lahendong geothermal fields that already produce 20MW electricity since 2001 an a third extension is under study.

A World Bank (under the ASTEA programme) loan was given to Indonesia to support the REII (Rural Electrification II) project. This project provided support for PLN’s rural electrification programme and one of its objectives was to establish incentives for the private sector and cooperatives to join in the rural energy distribution. The programme mainly focused on mini hydro and mini geothermal grid-connected systems and the programme ran until 2000.

Small scale hydropower

The potential is estimated at over 500 MW. Currently around 20 MW of small scale hydropower applications are in use in Indonesia.

Renewable Energy Technology	Economic Potential (MW)	Installed Capacity (2004) (MW)
Geothermal	27,000	807
Hydro	75,000	4,200
Mini/Micro Hydro	500	84
Biomass	50,000	445
	Resources	
Wind	3-6 m/s	0.6
Solar	4.8 kWh/m ² /day	8

Table 3: Renewable Energy Potential Installed Capacity - Source: MEMR

The main policies related to Renewable Energy include⁶:

- National Energy Policy: (Ministerial Decree: No.0983 K/16/MEM/2004);
- Blueprint of National Energy Management Policy: 2005-2025 (Target and Implementation Program);
- Green Energy Policy: (Ministerial Decree: No. 0002/2004): Implementing the maximum utilization of renewable energy and Efficient utilization of energy;
- Small Distribute Power Generation using Renewable Energy: (Ministerial Decree: No. 1122 K/30/MEM/2002) Developer Small Enterprises with Capacity : < 1 MW and Electricity Price by utility;
- Geothermal Law: (Law No. 27/2003);
- Regulation on Electricity Supply and Utilization: (Government Regulation No. 03/2005)

⁶ Interview with Directorate General of Electricity and Energy Utilization (DGEEU), January 2007, Jakarta, Indonesia

The main barriers why the illustrated potential has not been translated into a larger scale use of renewable energy are classic:

- The higher initial investment cost compared to conventional energy sources, e.g.;
 - o the oil subsidies;
 - o the natural oil, gas and coal reserves;
- The lack of a supportive policy framework and financial incentives;
- A lack of general awareness on policy and planning level, and an according lack of specific technical capabilities in the field;
- An underdeveloped local industry

In 2002 a new regulatory body was established, i.e. the Power Market Supervisory Agency, which was to create incentives for rural electrification programs. However, little progress has been made on these proposals, mostly because foreign and private companies have shown little interest in investing in Indonesia's electricity sector. Some of the previously-cancelled Independent Power Producers (IPP) projects have been revived, but many of them remain in a stalemate over payment disputes.

There are some signs of hope for renewable energy, namely in the recently launched "triple track economy" (pro-poor, pro-job and pro-growth), a policy in which the Government promised to speed up the development of renewable energy.

The various policy initiatives to increase the awareness of the importance of renewable energy in a sustainable energy system have shown rather limited success though.

The following sections will describe the situation and experiences in Indonesia with regard to poverty reduction, solar energy and micro finance. Specific attention will be given to the past experiences with regard to Solar Home Systems (SHS) in Indonesia, with a view to identify potentials for improvement in ongoing and new initiatives.

III. Poverty Reduction Strategy

Development of the PRSP in Indonesia

The National Government of Indonesia started formulating a National draft I-PRSP in 2002, which was finalised in late 2004. The diverse conditions throughout the Indonesian archipelago (e.g. largest poverty numbers are on Java but highest incidences are off-Java) required a specific, decentralised approach. Local Governments were requested by the National Government to prepare regional PRS at provincial and district levels, in order to carry out local poverty diagnosis and provide a better understanding of the local situation and needs.

At the same time the World Bank started preparing the Initiatives for Local Governance Reform (ILGR) Project, aiming to improve local governance and to reorient local governments in developing more pro-poor initiatives. The underlying rationale was that adopting this decentralised approach would help the National Government to develop a model for locally PRS formulation, to implement a fully consultative and participatory process in local policy formulation, and to improve the local planning and budgeting processes. This resulted in the development of so called Poverty Reduction Strategy and Action Plans (PRSAPs), the results of which then feed into the National PRSP.

The National PRSP process is under the auspices of the Poverty Reduction Committee and is led by the Minister of Peoples' Welfare, although much of the work is being carried out by the national planning agency. The PRSAPs are put together by a multi-stakeholder working group at local level, with local government officials, local parliament members, NGO and community representatives. The issues identified in the PRSAPs are compiled and conveyed by ILGR National Secretariat to the National PRS Secretariat.

Lessons learned

The major barriers recorded from the PRSP process in Indonesia include:

- The PRSP aims to cover an unrealistically high number of issues at the same time, and there is a lack of alignment and connection with already running (poverty reduction) policies;
- The participatory PRSAP formulation process (inevitably) takes time, and although well described on paper, participation of society was generally weak (i.e. was not maintained after initial promising initiatives);
- Environmental and natural-resource dimension to poverty alleviation is not sufficiently recognized (e.g. deforestation rate of 2.4%/year);
- There is a lack of authority and labor delegation with regards to the implementation of the strategy (i.e. it is not clear which agencies are responsible for implementing the strategy);

Accordingly the following recommendations can be formulated:

- The identified problems and action plans should be ranked and prioritised;
- Creating and maintaining linkages with actors in the field is essential;
- Pre-commitment from the heads of local executive and legislative bodies is crucial;
- District-level stakeholders generally have the capacity to formulate local PRSAPs in a participatory manner and are willing to work voluntarily as long as they get facilitation and support;
- Learning from other districts is more effective and needs technical facilitation to allow for a well structured learning process.

IV. Micro Finance

IV.1. Introduction

Indonesia has been one of the first countries to develop commercial micro finance in Asia. Micro finance has been included in the formal financial sector and many of the government development programs have managed to provide funds to a high number of low-income people throughout Indonesia. With regard to the Millennium Development Goals the GOI has targeted to reduce by half the proportion of people in living on less than a dollar a day in 2015. One of the keys to increasing the income of the poor is through improved access to reliable and affordable energy, especially energy for productive uses such as home industries, small trades, and agricultural-related activities. However, until 2004, over 90 million Indonesians do not have access to electricity grid and two-thirds of these people live in rural areas. Meeting the demand for reliable and affordable energy services among the unserved population across Indonesia will require increased access to finance, especially for decentralized energy solutions.

The baseline scenario for financing rural energy development has been predominated by donors and government funding, as the provision of energy services to rural people has been faced with the limited financial capacity of these households to pay for such service. This has kept these energy solutions from taking off because the grant-based funds either dried up or was limited in size and time. Therefore, the participation of commercial financing (especially micro finance) to respond to the vast demand for modern energy solutions in rural and remote areas is essential. Many recorded case studies in various developing countries have demonstrated that decentralized energy provision for the (economically active) poor and small enterprises can be financially feasible and sustainable if it involves income generation. Such can be achieved if through the utilization of the respective energy system, the user would be able to reduce production cost, minimize the labor employed, and/or create extra value/income.

With over 70,000 micro finance institutions (MFIs) across the country and many new ones being established, MFIs offer the most obvious vehicle to foster the more than 40 million micro and small enterprises throughout Indonesia.

IV.2. Sector Overview⁷

Indonesia has a long history of commercial micro finance, starting a century ago with the Badan Kredit Desa (BKD or Village Credit Organisation), i.e. village-owned banks offering micro credit on commercial terms. Nowadays approximately 5,000 BKDs operate in Indonesia. The generic term for small financial institutions in Indonesia is Bank Perkreditan Rakyat (People's Credit Bank, or BPR). New secondary banks were established, also called BPRs.

Sustainable microfinance in the banking sector began in 1970 with the opening of Bank Dagang Bali (BDB), a private bank in Bali specialised in commercial microfinance, building its success on the knowledge of micro finance clients and on state-of-the art savings products. BDB was closed by Bank of Indonesia in 2004 due to governance and liquidity problems.

Bank Rakyat Indonesia units have been around for twenty years, and some forms of BPRs appeared already more than a century ago. In the wake of recent financial reforms

⁷ Country Profile Indonesia, Planet Finance

undertaken by the government, Bank Rakyat Indonesia transformed its sub-branches ('Unit Desa') network operating at subdistrict level. This network is now the largest and one of the most profitable rural micro banking networks in the developing world. As a direct consequence of the financial crisis, 82 commercial banks were closed, 13 were nationalised and others recapitalised or merged into a larger financial institution, e.g. the newly established Bank Mandiri. Another significant player in the formal microfinance market is the state-owned pawning company, Perum Pegadaian, serving millions of low-income people.

With these three main players (BRI, BPRs, and Pegadaian), the formal financial sector is the dominant force in microfinance, and outperforms the semiformal and informal sectors by a large margin.

In contrast with other Asian countries, the formal financial sector in Indonesia includes regulated financial institutions with the largest outreach in microfinance. Bank Rakyat Indonesia units, small financial institutions (BPRs) and the state-owned pawning company follow commercial principles in providing savings and credit services. BRI units tend to lend primarily for investment purposes (64% of credit portfolio outstanding as of December 2003), while BPRs finance more working capital (61.5% of their portfolio). At the end of 2001, supply estimates showed that BRI units were collecting two thirds of the savings mobilised in the formal and semi-formal microfinance sector, and 40% of the loan volume. BPRs had a 15-20% market share of the microfinance sector.

Attracted by the success of BRI Units, a few commercial banks started their own micro finance program, providing financial services to micro entrepreneurs directly or through smaller financial providers, such as BPRs.

More details are given below.

- ***Bank Rakyat Indonesia (BRI)***

The Bank Rakyat Indonesia units (BRI Units), or sub-branches, were first established in the 1970s under a government scheme (BIMAS) to provide agricultural inputs for rice cultivation. Unprofitable until 1983-4, the BIMAS was discontinued and the system was restructured with support from the World Bank and USAID. It transformed into the most successful rural network for microfinance provision managed by a commercial bank.

The BRI units built their success on demand-based financial products and the development of individual profit centres (originally called Unit Desa). Each BRI unit is treated as a profit centre, financially self-reliant and subsidy independent. At the end of September 2004, BRI was operating 4,049 units, and 325 branches.

At the end of September 2004, BRI had 87% of its loan portfolio in micro, small and medium enterprises, while the corporate lending represented the remaining 13%. 31% of the Rp. 58,119 billion (US\$6.2 billion) in loan outstanding was related to the micro enterprise sector, or Rp. 18,146 billion (US\$1.9 billion).

- ***BPRs or People's Credit Banks***

After the 1988 financial reforms new secondary banks were established, called Bank Perkreditan Rakyat (BPRs) or People's Credit Banks. Today, BPRs include rural financial institutions that meet the criteria specified in the 1992 Banking law (2,148 licensed BPRs) and almost 9,000 rural financial institutions that are not licensed (generic BPRs), such as LDKP, BKD and BKKs.

BPRs offer loan, savings and term deposits, but no checking accounts. They serve the middle segment of the micro finance market, and are generally chosen by clients who cannot provide enough collateral to access BRI loans. They have mixed results and generally low financial performance, weak management and lack internal auditing and supervision. BPRs do not directly target micro entrepreneurs and have been pushed by Bank Indonesia's regulations to do more conservative, collateralised lending. Public BPRs usually do not compete with one another as they cover different areas. In reality they often operate as quasi monopolies.

- **Perum Pegadaian**

Perum Pegadaian (PP) is a large state-owned company providing micro finance services to more than 15 million customers in 2004 through 812 branches. During that year, PP provided Rp. 10,450 billion (US\$1.1 billion) in loans, and generated a profit of Rp.230 billion (US\$24.7 million). PP provides generally small loans, 88% of PP loans in 2001 were less than Rp. 500,000 (US\$66).

- **Bina Swadaya⁸**

Bina Swadaya⁹ (BS) is one of the biggest MFIs in Indonesia. BS is a people-centred development agency managing a number of services oriented towards the development of self-reliant communities. BS has been involved in micro finance since the 1970s with the development of self help groups (SHG) and cooperatives, with a self-reliant, savings-first methodology. Twenty one branches facilitated the development of SHGs which was slowed down by a lack of capital. To respond to this capital need, BS participated to the bank's self help group linkage program (PHBK) starting in 1988, where BS recommended SHGs to banks (BPRs, BRI, Bank Danamon, Bank Budaya) and managed the disbursement of credits. It then became involved in micro banking by establishing its own five BPRs, with a more pro-poor approach than the rest of the BPRs.

From 2002 on, BS has adopted a micro credit model based on the model of MFI ASA (Bangladesh) - initially in four branches, later expanded to seven branches - with technical assistance provided by ASA. Following the ASA methodology, BS set up offices as service points and living quarters for local staff. Each credit officer visits three groups per day, or 18 groups per week, serving on average 397 clients. The groups are composed of between 15 to 30 members. The credit services provided by BS have the following features:

- No collateral requirement
- One loan maximum per person per year
- Simple application process and documentation
- Credit is given in cash directly to borrower at the branch level

In terms of savings, deposits are collected at clients' doorsteps. Clients deposit a minimum US\$0.25 per week, are remunerated by a competitive interest rate, while saving withdrawal can be done at anytime. They now manage 5 rural banks (Lampung, Bogor, Subang, Yogyakarta and East Java) as well as 13 non-bank MFIs. They have added a currency exchanging activity, which allows them more flexibility in terms of borrowing in foreign currency.

⁸ Interview with Bina Swadaya, January 2007, Jakarta, Indonesia

⁹ Bina Swadaya is an acronym of Badan Pengembangan Swadaya Masyarakat = Community Self-Reliance Development Agency

Area of Operations

Bina Swadaya's microfinance program (ASA pilot) operates in areas of high density of population and in economic active regions, where transportation and market infrastructure are good, and where banking facilities are available.

Clients

Bina Swadaya's microfinance programme targets factory workers, small farmers (maximum 0.25 ha of land), micro entrepreneurs with a household income under Rp. 1 million (in rural areas) and Rp. 2 million (in urban settings). Clients often are economically and socially vulnerable. In addition to the ASA model, Bina Swadaya also reaches 5,000 clients through its four BPRs and another 50,000 clients through self help groups.

IV.3. Barriers

Despite being a well developed sector, the micro finance sector is faced with a lack of awareness and application of basic micro finance principles among government agencies, semi-formal organisations and (some) commercial banks. For instance, there is still no central micro finance training provider, nor is there a formal credit bureau in Indonesia. Secondly cooperatives are seen as highly politicised and used as government funding vehicles, and a vast majority of NGOs remains unsustainable and dependent on donors' funds to operate.

There is a substantial need and potential for micro finance services in rural areas, as most commercial institutions (such as BPRs and BRI Units) tend to focus on district capitals and economically active regions. The geographical spread and diversity creates an additional difficulty to address the needs of micro finance providers for technical assistance and capacity building.

As for the use of solar energy Bina Swadaya has been considering a financial product for access to energy in rural areas based on solar energy. In this context they teamed up with solar panel provider Kharisma Perkasa Sejahtera. The regions of interest being considered are South Sumatra and Java. They would establish self-help groups in the villages of intervention, with the technical maintenance organised by Kharisma.

Despite success stories throughout the developing world demonstrating the financing potential for decentralized energy provision, these successes do not automatically attract existing MFIs to develop special credit programmes. As a consequence, the financing of such energy projects/investments is assessed individually with no standardized guideline and/or accumulative knowledge for assessing the energy system involved, leading to inefficiency and high transaction costs.

To unlock the potential of MFIs' involvement in advancing the provision of modern energy services across Indonesia, the above mentioned barriers need to be removed and enabling environments should be established. Furthermore, an effective mobilization of MFIs requires efforts to tackle challenges related to other key actors in the delivery supply chain, e.g. the energy solution providers and energy uses for specific small scale (commercial) activities.

Box 1 summarizes the key challenges in mobilizing the MFIs for a wider scale implementation of modern energy services throughout Indonesia, especially towards rural people, micro and small enterprises and those living under the poverty line.

Box 1 Challenges on Energy Delivery Supply Chain

Energy Solution Providers: Quality and reliable access to the information and least-cost technology options for their products and services as well as competence and capacity to develop sustainable businesses due to the low market penetration, managerial and entrepreneurial skills.

Productive-Use Energy Consumers: Knowledge about the options of modern energy solutions and the impact on their productivity; access to such modern energy solutions due to the lack of financing capacity and access to such energy solutions (products/services); and competence to carry out the operation/maintenance of the preferred energy solutions.

MFIs: Knowledge on the market potentials of decentralized energy solutions for micro finance business; assessing the feasibility of decentralized energy solutions especially with regard to the technical aspects; risk mitigation instruments that helps MFIs to gain confidence and minimize risks; sufficient credit fund portfolio for financing energy projects/investments.

V. Solar energy: the Indonesian experience

The Indonesian Electricity State Company (PLN) estimated there are over 6000 villages throughout Indonesia which will not be reached by the national electrification grid in the near future. Most of these villages are located outside of Java; 35% in Maluku and Papua, 28% in Kalimantan, 18% in Sumatra, and 12% in West Nusa-Tenggara and South Nusa-Tenggara. The remaining are in Java and Bali (5%), and Sulawesi (2%). Assuming an average of 10,000 houses per village, there are at least 62.2 million houses in the isolated areas to be electrified. Diesel generators are commonly used in existing rural electrification programs by PLN.

In the light of the above data, the potential is huge. Utilization of renewable energy (possibly using a hybrid system) can be considered to answer the problem of rural and isolated areas. The use of photovoltaic energy for rural electrification has been limited thus far. It is calculated that approximately 0.016% of the total numbers of houses throughout Indonesia have been electrified by utilizing photovoltaic energy. Over the past years different programmes have been launched to electrify remote and rural villages with solar energy. These programmes showed very limited success, even to the extent that observers stated that of the estimated 300-350,000 SHS currently installed throughout the country, only a minor fraction is thought to be still functioning. Due to different reasons, including systems being distributed for free, lack of awareness, training and capacity building in operation and maintenance, systems have been abandoned or thrown away, and system components, especially modules and batteries, were simply sold.

The various markets can be classified as follows:

- **Rich market regions:** where average income per capita is relatively high (above US\$1,000 p.a.) and the rate of inflation is less than 10% p.a.;
- **Moderate market regions:** where average income per capita is relatively low (between US\$500 and US\$1,000 p.a.) and the rate of inflation is less than 10% p.a.;
- **Poor market regions:** where average annual income per capita is low (below US\$500 p.a.) and the rate of inflation is above 10% p.a. In some regions, the inflation rate becomes an important cut-off factor since it may affect the interest rate of the credit scheme to be offered by the PV-SHS traders/distributors.

The high inflation rate is also an indication of the current unstable economic situation that may negatively affect the exchange rate between the local currency and the hard foreign currency in which many of the components of PV-SHS are obtained. Besides, per capita income of the potential PV-SHS users may be either seasonal or continuous. This also needs to be considered, to avoid credit repayment problems.

SHS sales performance has been highly disappointing, especially when compared to SHS sales figures for other countries, such as Sri Lanka and Kenya, despite lower income levels and poorer infrastructures. In Indonesia, the total number of households without access to electricity is a staggering 48%.

To increase the low electrification levels the central government implemented the PV-SHS Project through the Ministry of Energy and Mineral resources (ESDM), Left-behind Villages, the Marine and Fisheries in coordination with several Regional Governments (e.g. East Kalimantan and Riau). The programme targeted remote areas and the poorest sections of

the population. In 2007 the capacity of installed PV through the government project is estimated at 3.5 to 4 MW. Most of this capacity consists of individual systems. Secondly minigrids are in use in 20 Regencies (Kabupaten), generally with a capacity of 5 kW each in areas of Sumatra, Halmahera, and Nusa Tenggara Timur, and typically serving 30 to 100 houses per system. Hybrid diesel-solar systems are recently being introduced, aiming to reduce the use of oil fuel, and simultaneously increase the service hours of the electricity to the community. The typical power capacities in the isolated areas vary from 50 kW to 100 kW, with an average electricity output of the plant in the range of 300-600 kWh per day. In this respect the national Agency for the Assessment and Application of Technology (BPPT) in cooperation with PLN installed a hybrid wind-diesel-PV system in Rote, NTT with a capacity of 30 kW to serve 600 houses.

The following sections will describe the features, results and experiences of the major SHS programs in Indonesia, after which the major barriers will be identified.

V.1. Government Project

These projects are generally initiated by governmental departments or proposed by members of the parliament and aim to increase the quality of the life of the people. If the projects are initiated by the central government, the relevant department will generally request a list of the names of villages and customers which are selected to get PV-SHS in the respective areas. If the project is initiated by members of the Parliament, the idea is conveyed to the relevant Department, and conducted further by the Department. Next the Project is tendered; the companies answering the tender must fulfill technical and administrative requirements. The company winning the award will conduct training sessions for the local technicians with regard to installation and after sales services. The system that would be installed in the consumer's home must fulfill the qualification standards determined by the government. Usually the product is accredited by the Laboratorium Sumber Daya Energi (LSDE).

The majority of the systems is granted free of charge to the consumer, on the rationale that the targeted consumers are very poor people who cannot afford down payments or monthly payments. Mini-grid projects are initiated by the company which was awarded the project, and the consumers/communities will form groups to establish the rules and procedures of the use and operation of the system. The consumer pays for the services, i.e. not only for the physical electricity but also for technicians who maintain the system and conduct collections.

Over the last 10 years the local governments had budgets allocated for SHS as part of the pre-electrification programme, and several thousands of PV systems were installed under this programme, especially in Kalimantan. The end-users received the systems (typically a 50 Wp module, 70 A battery, charge regulator, three 7W lights, and a battery box) for free and where supposed to pay a monthly fee of 10,000 Rp (= 1USD). This money would be collected by the KUD (Local Cooperatives) and used for replacement of the batteries. Unfortunately most of these projects ended up in just supply and installation of the PV systems and no maintenance nor collection of fees was ever done afterwards.

Beside budgets for SHS, the local government allocated also budgets for PV solar water pumping systems, community centres powered by solar energy, a project for schools and a project for solar lanterns for midwives. In 2005 the department of mines and energy started a campaign for promoting PV in urban areas. The institute of technology (BPPT) was involved in various solar energy programmes and also in the installation of solar-diesel hybrid

systems, solar street lights, solar water pumping systems, solar community centres, solar energy for schools, and solar energy for PUSKESMAS (Dispensaries). Lots of studies are done by the institute with assistance of foreign institutes and various schemes are implemented.

The main weaknesses observed with this type of projects are:

- **Ownership issue:** as the SHS are given for free there is no sense of belonging, meaning the systems are taken for granted and not taken care of as if it was the user's own system. In addition the free SHS approach holds a risk of affecting the commercial market for SHS;
- **Remoteness of villages and consumers:** because the number of consumers in one central location is usually insufficient to fund the service centre costs, it is often difficult to maintain a service centre in the field;
- **System quality:** the product quality often does not fulfil common technical standards (e.g. in Aceh and South Sumatra).

V.2. Private Sector: the BRI – Distributors SHS Programme

Several distributors have conducted commercial sales of SHS, generally in those regions where the local community has a steady and sufficient income. Such has been happening in plantation or fishing areas (fisherman and pond breeding) where people get their income from the plantations and from fishing on a regular basis. The BRI – Distributor program is described below as an example of such a project.

In 2005 and 2006 BRI (the major commercial bank of Indonesia) together with two distributors of SHS (i.e. PT. Mambruk International and Shell Solar Indonesia) worked under the Village General Credit (Kupedes - a national loan for housing programme) to propose SHS under a credit scheme. The two distributors succeeded in selling 1,000 units of SHS each, mostly in the plantation area, where farmers receive a regular and decent income, generally exceeding 2 million IDR per month from the plantation. The average credit period was 1 year, as the distributor has difficulty in "working capital" if the credit period is over 1 year. The client has to put a minimum down payment of 1M IDR as a condition to obtain a loan through BRI (duration 4 years, interest rate 18%). No investment subsidy is provided, as there is for instance in Bangladesh's REREDP. A former programme financed by the World Bank in South and West Sulawesi included an investment subsidy at 2 USD per Wp.

The main constraint in the development of the PV-SHS program has been the collateral. For productive activities BRI is willing to accept business collateral conducted by the villagers, like small shops (warung), paddy rice fields, the trading goods, etc. As the SHS system in itself is not a productive activity BRI asked for a collateral which farmers generally can not provide. One way of dealing with this was to make the SHS the collateral. But the BRI wondered who will purchase the SHS system/module in case of default and finally did not accept this approach, i.e. the "buy back guarantee" was felt insufficient by BRI. Therefore BRI required the distributor to open an "escrow account" which served as a guarantee for the BRI in case of default. Still, the amounts required for the distributor were so high that most of the clients had to show regular guarantees to obtain their loan.

This program finally could not be continued as the coverage of the program turned out to be too low, e.g. in one village only 10-20% of the target group would be eligible for the credit program. Under such conditions BRI's operation would not be profitable due to high collection costs. Several SHS distributors have the opinion that the market density is not adequate for the BRI scheme, and a service centre to provide after sales services is simply

not economically sustainable. The BRI program therefore in the region lasted for only one year.

As from the consumer's side the SHS is not the main priority of the farmers living in plantations. The first selection would be motor cycles, or a system that is able to run a TV, which basic SHS are not able to do.

The main weaknesses observed with this type of projects can therefore be summarized as:

- **Small consumer densities:** the low market density makes a sustainable business model covering all operating and marketing costs very difficult;
- **Distributor's working capital:** the equity of the distributor only turns out to be insufficient. A solution could be for financial institutions to fund the distributor's SHS selling business on a consumer credit basis;
- **Competition between government and private initiatives:** As the government SHS program also enters the BRI - Distributor selling area consumers do not want to pay their installments (monthly loan reimbursement), as the consumers' neighbours get their SHS for free.

The price of a SHS supplied to the Government through tender is typically between 300 and 400 USD. In private projects a 50Wp solar panel costs about 200 USD (directly imported) and the battery (70Ah) 30 USD, a controller 25 USD, battery box 10 USD, cables etc. 10 USD, meaning that the total price for the hard ware is 275 USD (without transportation, installation and profit margin). The installation costs also depend on the area, i.e. it is more expensive to install units in Kalimantan and Ambon than in Sumatra and Sulawesi.

With the increasing number of projects conducted by the government within the last two years, PV-SHS distributor companies also increase in number. Currently there are 22 distributor companies registered in the Association of Solar Energy Companies (APSURYA): PT. AZ, PT. Sundaya Indonesia, PT. Mambruk Energi Int., PT. Altari Energi Surya, PT. Surya Lestari, PT. Citra Katon Dwi Tama, PT. Len Industri, PT. Mitra Muda Berdikari Indonesia, PT. Guna Electro, PT. JICA in Trade, PT. Rimba Solar System, PT. Kandiasa Energy Utama, PT. Global power System, PT. Bangun Baskara Mandiri, PT. Bangun Bumi Persada, PT. Indo Cyber Nusantara, CV Ratna, PT. Pancuran Mas, PT. Seguro Lor, PT. Prima Daya Solusi, PT. Indo Jaya Solusi Sistim, PT. Suar Inter Muda, PT. Sun East Perdana, and PT. Waled. The largest PV-SHS companies are PT. AZ, PT. Len, PT. Sundaya Indonesia, PT. Segoro Lor, PT. Pancuran, PT. Bangun Baskara, and PT. Guna Electro.

V.3. Main barriers to PV market development

Despite the huge need for rural electrification the following barriers facing the SHS business in Indonesia were identified:

At policy and structural level:

- **Design of government programme:** Government programs do not incorporate the concept of commercialization and sustainability. Moreover they are not aligned (and even tend to negatively interact) with private sector initiatives. In addition the lack of ownership (by giving SHS for free) has not proved successful. Adjustments should be considered to create a minimum commitment from the end-user to the SHS (e.g. through minimum down payments in line with ability-to-pay; possibly by providing a smaller system for minimum energy services);

- **Ongoing subsidies for conventional energy:** The excessive subsidized price of conventional energy in Indonesia makes the commercial price of SHS comparatively expensive;
- **Market density:** Potential SHS users are scattered over a remote area (typically a 20 to 150 km radius). This will place unbearable strain on selling and collection expenditure unless more than 50 potential end users per annum per district can be secured. Most banks do not have collection systems to deal with scattered clients in remote areas without liquid collateral and legal documentation. Similarly the existing sales networks do not reach end users living in remote areas, and the frequently poor access roads make it impossible to reach many unelectrified villages.

At end-user and credit level:

- **Reputation for SHS:** Villagers who are aware of SHS are put off by the bad experiences of their neighbours owing to the hitherto poor product quality and disappointing (or often non-existing) after-sales service;
- **Expectations too high:** In developed market regions such as West Java and Lampung, some potential consumers seem to have unreasonably high expectations of the SHS. In the rural areas of South Sulawesi however, most villagers would be happier with bright lighting and sufficient power for radio and black-and-white TV operation;
- **Limited purchasing power:** Offering the 40-50 Wp system at the cash price of Rp 5 million is beyond the buying capacity of most villagers without grid connection, despite its cheaper life cycle cost compared to kerosene pressure lamps. Most villagers need credit support to finance their purchase;
- **Difficulty in accessing credit or non-availability of credit:** The working capital of many SHS distributor companies is too small to enable them to offer 24-month (or even 12-month) credit schemes for larger volume sales.

At SHS market players' level:

- **Business focus:** Distributors often lack business focus. Often the management and information systems used by SHS distributors are weak;
- **System quality:** The product quality often does not fulfil common or minimum technical standards;
- **Lack of skilled staff:** The above is worsened by a lack of training on operation and maintenance of the systems;
- **Sector development:** A stop-and-go character of the programmes hampers a gradual and sound sector development.

V.4. New Initiative

None of the approaches has turned out to be very successful; in fact hardly any program or system has been able to survive for longer than one year. A new approach is currently being developed by BPPT, through METI. The new approach will cover both individual and mini grid systems in the form of a national PV program. A detailed assessment is currently being carried out. According to the team leader of this initiative (Mr. Arya), the process will involve stakeholders and the concept is expected to be completed by May 2008, and next to be presented to the President later in 2008.

VI. Solar Energy for Rural Electrification using MFIs

Generally, to qualify for micro credit, a rural energy provision project must meet the requirements and conditions set out by the micro credit institution, and these may vary from one institution to the other. The conditions and requirements should include at least the following elements:

- Credit Limits (what is the maximum credit amount to be disbursed);
- Credit (Maturity) Period (how long is the period of the credit);
- Use of Proceeds (what the credit to be used for);
- Eligibility of the borrowers (who is the qualifying borrower);
- Risk guarantee tools (what are the instruments available to mitigate the risks).

It should be noted that fitting the financing of rural energy provisions into micro financing schemes should be carefully analyzed, due to:

- Limited financing capability to support rural energy investment;
- Business feasibility especially in the case where the revenues rely only on user fees to cover investment, operation and maintenance costs;
- Eligibility of the borrowers, in which irregular income streams of rural people may defer them to qualify as borrowers, unless the credit is used for productive activities and can demonstrate foreseeable revenue stream; and
- Risk mitigation capacity, in which the rural energy provision adopting renewable energy options are exposed to technical risk during the construction, operation or maintenance phase. Furthermore, risks may be (perceived) high if the main source revenue comes from user fees (especially rural household users).

BRI Unit Desa (BRI Village Unit Bank), the leading micro financing institution in Indonesia, can be one of the organisations to support financing for rural energy provision projects. There seem to be several advantages to BRI's approach:

- It offers a low interest rate (about 16%) compared to other MFIs;
- It requires no collateral required for a loan under IDR 2,5 million;
- It could provide a loan up to IDR 50 million (with 125% collateral);
- It could provide a group-based loan (comprise of maximum 10 borrowers);
- It could provide a loan to a cooperative (credit limit depending on financial criteria);
- It is in principle capable to provide higher credit (e.g. over IDR 50 million);
- It is capable to mobilize public savings (statistics from the Bank of Indonesia show that BRI Unit Desa across Indonesia has mobilized IDR 21 trillion of public savings). BRI Unit Desa has a wide coverage to rural areas across Indonesia of 3,800 village-level units. BRI Unit Desa aims for its credit lines to finance productive (income generating) activity. About 90% of their outstanding loans go to this sector, while the consumer credit only stands for 10% or less. The consumer credit is normally applicable for employees with regular monthly income.

In comparison to other financing institutions BRI Unit Desa is relatively more prepared and better equipped to provide loans to rural energy provision subject to various criteria, e.g.:

- Loan scalability (it should within BRI's rural business credit limit and scheme);
- Commercial and turnover feasibility;
- Self-financing capacity;
- Repayment capacity.

VI.1. Financing Barriers for Rural Electrification

In general, lack of access to modern energy services and low affordability contribute to the problem of rural electricity access. Rural communities with high incomes such as coconut palm farmers (i.e. ranging between IDR 1 million to 2 million per month or about 3 to 6 times the average rural income) greatly demand (and in principle have the resources to pay for) modern energy access. For rural people whose income is very low, like part time farmers (labor to land owners with salaries ranging between IDR 150,000 to 400,000 per month) the issue is more complex, not only with regard to the need to obtain least-cost energy solutions but also on the ability to pay for the services and the investment. With 75% of Indonesia's poor population living in rural areas, the affordability issue is one of the major barriers in improving electricity access.

The financial barriers for rural energy service providers include:

- Higher cost of economy for delivering energy service in rural areas due to its remoteness or hilly terrain or disperse population;
- Low energy consumption to reach the necessary economies of scale;
- Insufficient and unreliable repayment capacity.

Currently the conventional commercial banking system in Indonesia has not shown high interest in financing for rural electrification and renewable energy projects and programmes. Some of the reasons rendering rural electrification projects not sufficiently attractive to the banking sector are:

- Unreasonably high perceived risks toward these types of projects;
- Inefficiency of costs of administration, monitoring and credit collection in comparison to the amount of loan (financing);
- Incapability of rural people to meet bank requirements on additional collateral;
- Limited access to equity financing.

Unless the project meets the stringent requirements for a bank loan (e.g. 5 C principles - Character, Capital, Capacity, Condition, Collateral), this sector is considered to be not feasible under the bank standard. The problem faced by new types of projects seeking for bank loans is the lack of knowledge and understanding of the bank officials towards the respective project which influences the way the project is assessed. If the project is not fully understood (in terms of its potential risks and the tools to mitigate these) the bank would impose high collateral requirement (105%-125%). This situation constitutes barriers for many new technology driven projects, including renewable energy.

The high perceived risks towards the rural electrification that hinder many financial institutions include:

- Technical risks due to the adoption of new technologies for off-grid system (village grid or individual system) which are not yet present or proven successful in Indonesia;
- Financial risks due to the borrowers financial profile, i.e. its income stream and repayment capacity which may not meet with the banks' terms and conditions;
- Market risks because there is no track record of the market existence, thus the market remains to be created.

Under the banking system, having a historical record is very important, and this is an area where rural electrification projects may find it difficult to meet these requirements because many of the projects have been financially designed based on grants, thus banks barely have any references of any electrification projects that were successfully implemented with good

repayment performance. In principle, the banking system is not prepared to accept new types of projects or investments they are not familiar with. Even if they are willing to provide the financing, they would impose additional collateral of 105% to 120%. The collateral requirements have become the main barrier for rural electrification projects. Further, relating to small scale or community-based RE projects, another barrier would occur due to the size of the loan (too small to cater, non efficient loan administration costs), not to mention that the targeted markets are considered to be not sufficiently creditworthy (i.e. not having regular and enough income).

Two organisations whose profile could be interesting when developing new or improving ongoing initiatives are described below.

- **KPS**

Kharisma Perkasa Sejahtera (KPS) is one of the key players in applying solar energy for rural electrification and poverty reduction. Their solar program, which installed 500 SHS in Lumpur, Aceh and Pugolo (Sumatra) East Java and Timor thus far, is built around 3 main goals:

- Finance access to solar energy;
- Training and capacity building;
- Promote local solar technical components.

It is emphasized that poor populations in remote and rural areas, apart from financial support (for example through an investment subsidy), need to be educated and trained with regards to electricity in general, and solar systems in particular. First experiences of KPS show there seems to be no real problem in the collection of the fees for maintenance¹⁰. KPS provides training during the installation of the SHSs.

- **PNM**

An organisation of special interest is Permodalan Nasional Madani (PNM), which might in principle be the equivalent of IDCOL in Bangladesh. As is illustrated in the D3 policy Review - Bangladesh the expertise and coordinating role of IDCOL is a key success factor in the RERED project.

PNM is a state-owned investment firm created in June 1999, by the Government after the financial crisis to take over the refinancing role of Bank Indonesia and to empower and develop the SME sector, cooperatives and micro finance sector. PNM acts as the link between commercial banks and BPRs, commercial banks and non-bank microfinance providers. PNM provides loans to non-bank micro finance providers, through regional development banks (BPD). The financial assistance offered by PNM will take the form of loans and capital assistance through PNM-Venture Capital and PNM-Investment Management, affording access to the capital market. Management assistance will be provided from initial establishment and include design of a business plan, financial restructuring and operational assistance. PNM maintains partnerships with research institutions throughout Indonesia, government ministries, educational institutions and active business players to develop successful businesses, applying an integrated approach. PNM has transversal relationship with the ministers of finance, cooperatives and SMEs.

There is some history and background on energy, e.g. PNM financed loans to cooperatives to buy a generator used for 500 families in a rural area. With the increasing energy demand and the desired decrease of oil dependency, PNM is looking to enter the solar market and

¹⁰ Interview with Kharisma Perkasa Sejahtera, January 2007, Jakarta, Indonesia

intends to develop a suitable financial model based on the cooperative model they applied before¹¹.

PNM has a central training centre in Jakarta and one in every branch of PNM. Currently PNM has 40 branches and affiliates widely covering Indonesian provinces.

A research project as part of the I3A framework¹² investigated the sustainability of off-grid PV energy services (PVES) using data from case studies in Lampung, West Java and Nusa Tenggara Timur, and came up with the following recommendations:

- **Social sustainability:** Promote a civic PVES social system by acknowledging the interests of all stakeholders, encouraging their active participation and enhancing self reliance;
- **PVES accessibility:** Build user autonomy so that users have the capacity to participate actively in the PVES social system, with access to PVES financing, skills and networks, thus maximizing PVES equity;
- **PVES availability:** Understand the potential discontinuity during and after the implementation period and ensure availability in both periods. This requires a paradigm shift from emphasising the hardware dimension of technology to emphasising the software and organisational dimensions;
- **PVES acceptability/acculturation:** View PVES as an enabling technology, thus focus on using the PVES delivery to enhance pre-existing local resources for sustainable rural development rather than on the PVES technology itself.

As the main drawback of the I3A model it is mentioned that it requires substantial effort to implement. However, a similar investment may be necessary to achieve good outcomes regardless of the approach used.

¹¹ Interview Permodalan Nasional Madani, January 2007, Jakarta, Indonesia

¹² The I3A Framework – Enhancing Off-grid Photovoltaic Energy Service Delivery in Indonesia, 2005

VII. Summary and conclusions

This report has provided a detailed overview of the current status and the existing policy initiatives in Indonesia. The first observation is that none of the approaches applied thus far in Indonesia has been very successful, and this because of various reasons. The government project has mainly failed due to the lack of ownership of the SHS, as well as poor quality and maintenance for the systems. As for the private initiatives the insufficient number of creditworthy end-users was a key barrier, which partly had to do with socio-economic aspects and poverty levels, and partly with the scattered nature of communities in the remote and geographically diverse areas throughout Indonesia. Furthermore the government and private programmes running in the same areas seemed to have weakened rather than strengthened the respective initiatives. An alignment of programmes or joining of both forces could help in overcoming many of the observed barriers.

Still, the infrastructure and expertise especially with regard to micro finance is largely available in Indonesia, and the expertise which was built through the former solar programmes should facilitate the design and implementation of improved programmes. The approach which proved very successful in Bangladesh (i.e. the REREDP project ran by the semi-public finance institution IDCOL with funding from the World Bank) can be used as inspiration when designing and implementing future or ongoing initiatives. An inherent difference between the two countries though is the density in population, which in the case of Bangladesh makes it relatively easier and more cost-effective to open and maintain service centres in the field, whereas this is much more costly in the case of Indonesia with its remote communities scattered over the archipelago's many islands. A focus on community systems rather than household level systems seems appropriate for Indonesia, i.e. mini-grids using solar energy and/or hybrid systems using solar and diesel or biodiesel. In addition small and medium sized companies should be targeted, aiming to link the provision of (solar) energy more closely to income generation and improve the socio-economic situation of poor(er) people.

Before the above ideas can be put into practice some structural aspects should be improved. A primary aim for RENDEV in Indonesia should therefore be:

- To launch a coordination process between the different government ministries and agencies running PV programmes;
- To launch a planning program regarding extension of the grid, as well as a detailed resource assessment of the solar and other RE potential in order to prioritise those areas where the use of SHS, and mini grids in general, is the most appropriate solution;

The aim throughout the RENDEV project's communication activities (i.e. district local workshops and training sessions) will be to integrate these recommendations in the toolkits and apply these (ideally as part of an existing program) in a defined area where people can be trained using SHS (and possibly hybrid energy systems).

The new approach which is currently being developed by BPPT through METI may integrate some of those elements. The new approach as a National PV program will cover both individual and mini grid systems, but more detailed information about the programme is not available at this point in time. Wherever possible and feasible within the time frame of the project, the RENDEV activities should support and strengthen this new approach.

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Case study 1: PLTH Kalimaron, Seloliman. East Java

The Microhydro Electricity Generation Project (PLTH) Seloliman was established in 1994 based on initiatives of PPLH Seloliman. PPLH Seloliman is an environment education center located in the Trawas sub-district, Mojokerto district, East Java. Despite the fact that the area has already been served by PLN, PPLH intended to promote the utilization of renewable energy (hydro) which was also used as a means to promote forest conservation. The micro hydro is using a run off system and therefore does not require a dam which could distort the water flow.

Project Preparation

The initiative was supported by Yayasan Mandiri and MHP GTZ, a donor funding program which provides technology, technical assistance and a grant to build a 12 KVA micro hydro unit. The electricity generated was used for lighting and computers in PPLH, and for supplying electricity to households in its neighboring village Janjing. Janjing is the only area in Seloliman village that was not served by PLN due to its distance, mountainous areas and disperse population with just 32 households.

Once in operation, PPLH handled the whole management system, but there were no clear rules or regulations imposed on the electricity users. This situation led to a low sense of belonging of the community and improper management of the system (including over utilization) causing frequent machine breakdowns. PPLH intended to solve the problem and create a more systemic approach, also in light of the possible capacity upgrade of the micro hydro unit to 30 KVA. In this attempt, PPLH collaborated with LEM21, an organization that has an expertise in community preparation (social engineering) and project sustainability. Again, the project received support from MHP GTZ, which helped to identify and connect with other funding agencies: Global Environment Facility – Small Grants Programme (GEF-SGP) of around IDR 250 million (27,388 USD) of which IDR 100 million was intended to cover the investment capital needed. The rest was for capacity building, community empowerment, business capital and remuneration for the service. The grant was disbursed directly to PPLH's account who then managed it for the whole project scheme. From the technology side, the project has been supported by PT Hexa who provides micro hydro turbines and electrical and mechanical engineering expertise. In a later stage and to support business activities, GEF of SGP supported a grant fund of a total IDR 91 million (USD 10,000) to be used to finance kapok blowing, recycling paper and fish farming activities.

During the construction the community of Janjing village contributed their efforts, raw materials (stone and sand) and necessary land for the distribution line. To handle the whole managerial system an institution was created consisting of representatives of PPLH and the community (electricity customers), called Paguyuban Kali Maron (PKM) which was formed in 2001.

Legal Framework

The Seloliman Micro hydro project sells electricity to end users (community, business and education center) and to the PLN grid.

- ***Electricity selling to end users***

The tariff for the end users was decided based on a consensus that was later confirmed in a Decision Letter. The consumption of electricity is measured through metering systems. The scheme of electricity tariffs consisted of base load and consumption price, and is divided into several classes:

- The base load price for 200 Volt Ampere (VA) is IDR 3000, 450 VA is IDR 5000, 900 VA is IDR 8000, 1350 VA is IDR 10,000 and 2500 VA is IDR 12,000;
- Consumption of metering: ranging from IDR 80 - 120 (depending on class) per KWh utilization (based on metering).

The profile of end users is:

- 10 households (HH) for 450 VA; total 4500 VA
- 29 HH for 200 VA; total 5800 VA;
- 3 HH for 450 VA; total 1350 VA;
- 2 businesses : kapok blower 3000 VA and recycling paper 900 VA located in Sempur hamlet;
- PPLH Office and facilities 7600 VA.

- **Electricity selling to PLN under PSK Tersebar**

The excess electricity capacity of the micro hydro unit is sold to PLN under a small scale power purchase agreement called PSK Tersebar scheme (Ministry of Energy decree No. 1122K /30/MEM/2002 dated 12 June 2002 regarding prioritizing Renewable Energy Source with a maximum capacity of 1 MW). The decree guarantees the fixed rate of electricity buying at 80% of the cost of supply of service (Harga Pokok Penjualan/HPP) for connection to medium voltage and 60% of HPP for connection to low voltage grid. In fact, PKM Kali Maron's project is the first contract under PSK Tersebar.

To gain all of the necessary permits, PKM followed a parallel approach; at local level (PLN district, Bappeda and Bapedalda) and central level (Ministry of Energy and Mineral Resources). PKM submitted the proposal on PSK Tersebar to PLN Province through the PLN district office. In the PLN district the cost of supply of service (Harga Pokok Penjualan/HPP) is set. The cost of supply of service consists of the cost of investment, operation and maintenance and a reasonable return. The PLN Province, after agreeing the contract, will release recommendation submitted to Ministry of Energy and Mineral Resources of the Directorate General of Electricity and Energy Utilization (DGEEU), who will then conduct field-testing based on an operation feasibility test. Upon satisfactory performance, DGEEU released an approval for project commissioning. The permit for Paguyuban Kali Maron to generate electricity under the PSK scheme was released by DGEEU under Ministerial Decree No.310-12 / 600.3 of 2003. The permit is valid for 5 years with the possibility of renewal. PKM receives approximately IDR 4 million per month from the PSK Tersebar activity.

Governance

As mentioned above, to handle the micro hydro project in a more sustainable way, PPLH and the local community formed an institution called Paguyuban Kali Maron (PKM). The members of Paguyuban are all the electricity customers. The management committee was chosen by all the members (in a participatory approach) and a lead by PPLH consisted of representatives from PPLH, Janjing and Sempur village. PKM has developed rules and regulations related to electricity utilization, including tariff and penalties for delay in payment. Such guidance is important to ensure that the electricity customer will pay for their usage. The rules also set monthly remuneration rate for the managing committee for their service, which rate was determined through consensus among PKM members. In terms of operation and maintenance related to the technology, the managing committee members are trained by MHP-GTZ.

Financial Performance and Associated Risks

- **Financial Performance**

Despite the project being intended to be managed in a professional way and adopt the market based principle, it remains difficult to assess the risk associated to financial aspects due to lack of reliable data on flow of money at a certain time/period. As mentioned above, basically PKM sells its electricity to end users; there will be two different charge schemes namely base load installment and electricity usage with fixed selling price (0.8 of cost of supply).

Type of customer	Capacity class	Number of customer	Tariff	Total (customer *tariff) - IDR
Household	200 VA	29	3,000	87,000
Household	450 VA	13	5,000	65,000
Recycle paper	900 VA	1	8,000	8,000
Kapok blower	3000 VA	1	12,000+5,000	17,000
PPLH office and facility	7600 VA	1	(3x12,000)	36,000
			Total Revenue (A)	213,000

Table 4: PKM Base Load Installment

- **Electricity usage installment**

Assumptions:

- Customer utilize the electricity supply 12 hours / day (household from 6 pm to 6 am and business from 8 am to 8 pm);
- All of the allocated electricity is consumed by the customer;
- Tariff of electricity usage is flat IDR100 / kWh.

Customer class	Number of customer	Watt hour / day / customer	kWh / day / customer	Income / month /total customer - IDR
200 VA	29	200*12	2.4	208,800
450 VA	13	450*12	5.4	210,600
900 VA	1	900*12	10.8	32,400
3000 VA	1	3000*12	36	108,000
7600 VA	1	7600*12	91.2	273,600
			Total Revenue (B)	833,400
		Total Revenue (A) + (B)		1,046,400

Table 5: PKM Tariff Setting

- **Selling to PLN**

There are no accurate data on the amount of revenue that is derived from electricity selling to PLN. However, PKM indicated that they could get approximately IDR 4 million per month.

- **Revenue versus cost per month**

Based on the end users installment and income from PLN, it could be calculated that PKM can receive approximately IDR 5 million. Monthly cost that should be borne by PKM consisted of remuneration for the PKM management committee of IDR 700,000, and maintenance costs at IDR 100,000. With the investment capital of IDR 100 million for facility upgrading and IDR 108 million for connection to the PLN grid and unit lifetime of 20 years, it is assumed that the depreciation rate is IDR 867,000 / month. The total cost per month is then 1,687,000. Looking at revenues and cost figures PKM was profitable; however, the calculation does not include all the project preparation and support, training and capacity building, or rural business financing support from various donors.

- **Associated Risks**

On the end use selling scheme, the financial risk is quite low due to existing rules and regulation set through consensus. In terms of household installment, so far no significant problems have been observed. However, electricity selling to business is quite risky due to unstable production of kapok and recycled paper. On the PSK Tersebar scheme there is a risk associated with the PPA with PLN. In this project for the first year, the agreed PLN cost of supply of service (Harga Pokok Penjualan) was IDR 530 per kWh. In the PSK Tersebar scheme the cost of supply is to be reviewed annually even though the contract is valid for 5 years. For the second year the PLN cost of supply was decreased to IDR 426 per kWh. The reason stated by PLN on this situation is the incorrect calculation of the HPP in the first year, at the start of the contract. The miscalculation done by PLN is not supposedly born by the seller, which in this case is PKM. PKM already expressed its concern to involved parties including DGEEU; however, up to now there is no clear decision on the new pricing yet.

The five-year contract could also be seen as a potential pitfall that creates financial risk. Project lifetime for micro hydro is 20 years. Since most of the revenue comes from PLN, therefore, uncertainty of electricity selling after the contract is finished could endanger the project cash flow. From an overall business point of view, the PSK Tersebar scheme itself still possesses a drawback, because many regional PLN (at district and provincial level) are not yet familiar with the principles of operation of the PSK Tersebar scheme. This situation could lead to improper handling on approval process from the local PLN.

Project Sustainability

- **Lessons Learned**

Sustainability of the Project depends on several aspects, such as:

- **Partner organization:** PPLH Seloliman plays a very important role especially in network building since it is one of the biggest local NGOs. MHP GTZ and PT Hexa ensure the quality of technology performance;
- **Economic feasibility:** Monthly fees from households and businesses and revenue from electricity selling make the project economically feasible;
- **Funds management:** Although all of the funds come from grants, they are treated properly and hence lead to project sustainability;
- **Technology reliability:** Most of the main and spare parts are made locally. The technology provider provides training to several technical persons to be in charge of maintenance;
- **Commitment from the community** in setting up the electricity pricing (sold to household) and in supporting the management of local consortium organization;
- **Community Organization:** Paguyuban Kali Maron was established and its chairperson was selected through consensus;

- **Clear benefits:** economical, social, educational benefits, as well as an improved security and access to information will increase the sense of responsibility of the community / members;
- **Clear ownership:** this will increase certainty and eventually create sense of responsibility of the community;
- **Integrated approach:** Electricity provision using micro hydro should be combined with conservation of catchments area.

Case study 2: Cooperative Sinar Rinjani, Lombok, West Nusa Tenggara

REC (KLP) was introduced by USAID in 1977, as USAID provided grants and loans to establish the Project Development Office of Rural Electrification (PDO-RE) under the Directorate General of Cooperative with the objective to develop three pilot REC projects, and to replicate the model throughout Indonesia. Three projects were conducted in Lampung, Lombok and Luwu. Initially all of them developed their own distribution network and used a diesel power plant. In Luwu they could not compete with the PLN tariff, as the PLN grid was closer to the customers' location and the customers wanted the same tariff as the PLN customers. The same thing happened in Lampung, still the KLP Lampung, instead of maintaining its diesel operation, can buy bulk power from PLN and sell it to the customers. On the other hand, KLP Lampung has an outstanding debt to PLN about 4 – 5 million USD¹³. KLP Lombok is the only electricity cooperative currently in operation, even with the average sales price of IDR 1200 / kWh.

In the mean time PDO-RE is now becoming a division in the Ministry of Cooperatives and Small Medium Enterprise.

Business and Financial Model

The business entity is a cooperative and is called KLP Sinar Rinjani. PDO-RE (with technical assistance from USAID) supports the development and organizational, technical and financial aspects. Engineering, procurement and construction initially came from the USAID loan, and then in the operation period the KLP collects customer's payment from consumers to repay the loan.

The project was online in August 1980, started with a 500 KVA diesel generator, covered three villages, then gradually KLP obtained a loan for installing additional diesel generators and expanded its grid and consumers reach. The total assets equal IRD 16,3 billion (US \$ 1.81 million), and last year's profit was IDR 22.45 million (US \$ 2,500). Although the average sales price is around IDR 1,200 per kWh, it is not reported that there are any problems of the members in terms of paying.

The generator's installed capacity is around 11,000 KVA, the peak load is 6,300 KVA serving 17,634 members (customers) in 40 villages of 9 Kecamatans. The potential consumers total 114,465 in the villages (electrification rate is 15.4%). In addition to electricity business, KLP Sinar Rinjani diversified its activities by developing other businesses such as saving and credit for its members, radio broadcasting and an ice making factory.

Legal Framework

Law 15 of 1985 concerning electricity, article 7 paragraph 2 provides opportunities for cooperatives to conduct electricity supply business under licence of electricity supply venture for the public (IUKU)¹⁴. There was also strong political support from the Government and

¹³ The cooperative was recently closed and all members were transferred to PLN. Due to the lack of technical standard, PLN can not operate the cooperative distribution system, instead PLN has to rebuild the system.

¹⁴ KLP Sinar Rinjani hold licence of 2389 of 43 of M.DJL of 1994 and it is also registered as Cooperatives under No. 427.a of BH of PAD of DKP.085.5 of 2003. These are of course renewal up date from its previous license or registration.

supported by the Regional Government, as well as from PLN in respecting the exclusivity of the concession areas.

Based on the above legal framework, the KLP Sinar Rinjani was developed and then gradually grew until it reached the existing conditions. However the challenges still remain because there are lots of people in the concession areas that are not electrified, or use illegal connection. Due to the Government strategy to reduce fuel subsidy, the generation cost will significantly increase over time.

Governance

The project was initiated by establishing a cooperatives entity under the name of KLP Sinar Rinjani. A board of supervisors and a board of directors were appointed. The highest decision making happens at the Members Annual Meeting or the Members Extraordinary Meeting. These meetings appoint the board of supervisors and board of directors. All of the above activities were supported by the PDO-RE with technical assistance from USAID.

PDO-RE continued to assist the KLP in institutional, financial and technical aspects. There were also training and capacity buildings for KLP management from the PDO-RE in order to support daily operation in terms of institutional and organizational aspects, engineering and technical aspects, financial and accounting aspects, billing, invoicing, procurement, processes and procedures, as well as consumer's preparation. Technical inspections and financial audits were provided by PDO-RE until 1986 when the cooperative's operation reached break even.

Social Preparation

Social preparation is an important step in the development of rural electric cooperatives to inform community's rights and responsibility, to discuss projects' environmental and land acquisition aspects, and most importantly, the financing aspect. There were lots of discussions and visits made by PDO-RE officers at the project preparation stage to link up with the community.

Financial Risk

It is acknowledged, that to provide rural electrification access from scratch, in general is not financially feasible. Therefore, a financial model scheme must be developed, and it is a case by case basis. A feasibility study must be conducted and an institution to grant the project must be available. For example, Ministry of Cooperatives has established a credit guarantee institution which will provide guarantee to cooperatives. In any case of financial schemes with the government, the regional government support is required, as well as bilateral, multilateral or other institutional financial support. The objective of the institution is to make the rural electric cooperatives scheme more feasible and sustainable. The support could be discontinued after the project reached its break event point.

Sustainability and Replicability

The programme's replication potential highly depends on its performance in terms of sustainability. The main factors of sustainability are the continuity of energy supply and a tariff that covers its cost of service as well as the ability-to-pay of customers. Fuel oil for the diesel power plant is available, but the price tends to increase. Another alternative is utilizing local renewable energy where it is available.

The provision of electricity for rural area needs significant support from the central and regional government, and bilateral, multilateral, or other financial institutions. One possible option is to develop a program that utilises electricity for productive uses, integrated with the

development of rural electricity cooperatives. For example the ice factory plant in the fishery area (also belonging to cooperatives) and the REC project as one integrated project could be more feasible and sustainable, and offer multiple benefits to the people in rural areas.

In any case an accurate feasibility study must be conducted looking into the household distribution and structure, the local economic activity, and other aspects before embarking on a replication of a successful approach in another area.

Case study 3: E7 Project (hybrid solar & wind)

The Decentralized Rural Electrification project was an AIJ project of the E7 Initiative. This project was carried out with the purpose of examining the feasibility of decentralized rural electrification using renewable energies focusing on:

- Reliability of appropriate technologies;
- Financial sustainability analysis;
- Cooperation with Indonesian partners;
- Common view of environmental, social, economic concerns.

Through:

- Local project management by E-7;
- Socio-economic assessments, integration studies;
- Integration of Grassroot Organizations (NGOs) in community activities;
- Development of sustainable financing schemes;
- Introduction of sustainable investment management;
- Implementation of: a) individual electrification (Solar Home System) and b) Grid electrification (village grid, HS, MHP).

The hardware was contributed by the GOI by giving 1000 SHS, and a “broken down” micro hydro turbine to be repaired, and the rest was the contribution of the E-7 Initiative.

Project Organization

Project partners

- Ministry of Environment (KLH)
- Directorate General of Electricity and Energy Utilization
- The E-7 Initiative

Project tasks

- | | |
|---|------------|
| - Project Management Unit (PMU) | : RWE |
| - Socioeconomic Integration | : EDF / HQ |
| - Solar Home System (SHS) | : KANSAI |
| - Micro hydro (MHP) | : TEPCO |
| - Hybrid Wind of PV(HS) | : ENEL |
| - Financial Sustainability Analysis (FSA) | : EI |
| - Activities Implemented Jointly (AIJ) | : OPG |
| - Lesson Learnt Review (LLR) | : RWE |

The SHS used are 50 Wp systems and were implemented in 3 villages in East Nusa Tenggara: Kualeu, Oelnaineno on Timor and Lengkonamut on Flores. The micro hydros were installed in Taaba (50 kW), Tendan Dua (69 kW), and a 12 kW system in Bokin, South Sulawesi. The power distribution systems supply 100 W to each household. The fourth micro hydro was installed in Waikelosawa, in Sumba with a capacity of 15 kW and the excess electricity is sold to PLN. The hybrid system in Rote consists of 22 kWp PV, 10 kW wind and 20 kW back-up diesel, and supplies electricity to the villagers through the low voltage grid.

Tariff for the SHS and the micro hydro ranges from IDR 30,000 to 36,000 per month, and exceeded the subsidized tariff of PLN. Ownership of the SHS will be transferred from the PLD (Pengelola Listrik Desa) to the users after 10 years. At the end of the year 2000 there were more than 4000 people connected to electricity, with more households being planned for connection.

Time Span: 1966 (Feasibility Study) – 2000 Commissioning and handing over

Ministry of Marine & Fishery: The project is under the responsibility of Ministry of Marine & Fishery. It applied a revolving fund for the purchase of individual systems and used the Grameen system as a distribution model. The project is the so-called Community Empowerment project and thus can draw the support of Energy Alternative Facilities for Lighting in Small Islands.

Business Model

Operation in the field is carried out by trained cooperative members, NGOs, and PLD. The management and payment terms are decided as a consensus of the community depending on their ability-to-pay, such as monthly payment or paying during the harvest time.

The SHS is managed by NGOs but micro hydro turbine generators and the PV wind hybrid system are managed by local cooperatives (after evaluation of the human resources available in the villages). Fee collection is also carried out by the local management and the collection is stored in Banks. The collected fee is meant to be used for the maintenance of the various hardware systems.

Legal Framework

PP No 3, 2005, amending PP No. 10 of 1989 stipulates that this scheme is possible, and according to UU No 15, 1985 for capacity above 200 kW the project requires an approval from the Minister of Energy and Mineral Resources. The application of Regional Autonomy Law requires another approval from the regional government for the concession, land use etc.

Governance

The management is elected by the villagers, and the necessary procedures were also decided by the villagers, e.g. the procedure of fee collection and penalty for late payments. The role of the traditional social organisation is very important to take up in the process, most specifically in the preparation stage.

Social preparation

A major focus of ensuring the project's sustainability was the design of an appropriate institutional concept incorporating all of the human resources available at the grassroots level. The project promoted the establishment of village-based electricity management units (Pengelola Listrik Desa – or PLD) to assume responsibility for the electrification scheme and to become the focal point for all project interventions within the communities. Management at the village level seemed promising due to a high level of acceptance by the users, open and responsive communication and the promising ability of the communities to accept and to maintain ownership of their electrification facilities.

The PLD can be seen as a micro project developer, assessing the potential for customers, providing and managing electricity services, and ensuring that a reliable fee collection system is in place and operating as expected.

The focus of this institutional set-up was to ensure that the quality of technology was accepted according to the expectations of the users, that there was an effective and long-term management of O&M services, and that user-support services were provided. The management and execution of a reliable and routine fee collection scheme remains a major challenge.

Modular management training was provided to the PLD at various occasions during the first year of operation. Monitoring and use of the introduced management tools made it possible to collect real field information about the technical and non-technical performance of the electrification schemes, even after being handed over. Therefore, the project was constantly in a position to address any persisting problems, to initiate related actions or corrective measures, and to increase awareness for guarantee matters. NGOs provide continuous support to monitor the PLD's activities.

Financial Risk

The GOI was committed to contribute to the project. The key risk involved in this kind of commitment was the timing. The government budget needs to be prepared one year ahead of the time of utilization, and its disbursement does not always coincide with the project time of implementation. This can create some delays in the implementation of the project.

On the part of the users there is a risk of consumers in not paying the fees if the service provided fails. Therefore it is imperative for the project owner to assure a good performing technology system for the rural villagers which in turn assures payment.

Sustainability and Replicability

- ***Sustainability***

From the technical point of view, with various renewable energy technologies being proven technologies, there is a very good chance for a sustainable implementation of this approach in rural areas. For some form of technology, such as wind turbine, spare parts replacement must be secured. Training of operators is also a must.

Social and institutional aspects for sustainability are to involve local people and customs, especially in decision making processes. The presence of 'mentors' such as NGOs and the cooperatives can add credibility to the effort.

Financial aspects are the key factor to be considered. This approach does not give anything free to the consumers, but it also does not earn enough money to replicate a similar project. Market sustainability will deteriorate if the economic activities of the villagers deteriorate, which should be taken into consideration from the onset, during the planning.

- ***Replicability***

Remote villages in Indonesia in general are suitable for this concept. Still, in order for the concept to be implemented in other sites, research for electricity demand, social economic development for the future, willingness-to-pay for electricity, and above all community preparation are necessary. Failure to recognize the importance of community participation in this kind of project can lead to a disastrous end of the project.

Business Model & Financial Model

The business is using the Lease-Buy SHS system. It's a management system used in a group with members coming from the local community. Every village has one group with a maximum number of its members coming from 50 households. Each of the households is provided with one unit of SHS by using Lease-Buy SHS system for five years.

The initial phase for the SHS programme is financed through the Government budget from the Department of Marine and Fishery. One of the SHS suppliers is selected to be responsible for the distribution for communities in small or remote islands.

Leasing Format

- Easy and fast process, no collateral
- Leasing Period for 5 years
- Zero interest

Payment Method

- Payment method is in installments

Revolving Fund

- Revolving Fund scenario is implemented in villages provided with SHS
- The scenario is matched with the total number of SHS installed, and the capacity of the community in paying the installment per month

The Benefit from Lease-Buy System

- The system is guaranteed to operate during the leasing period
- The leaser will be responsible for SHS hardware
- The management will be responsible to the leaser on assuring the sustainability of SHS during the leasing period

It is expected that the sustainability from the management group organization will be maintained after the end of the leasing period.

Legal Framework

Due to limited access to the confidential information of the project owner, the discussion is restricted to the government policy and regulatory framework, and not on the internal policy of the project owner:

- There are no regulations in the implementation of this program;
- The coordination with the local government is needed, for example with the head of villages;
- PPA is not needed in determining the level of the tariff that needs to be paid. However, there are certain rules between management team and each of the households to determine the mechanism in the lease-buy model in this program. An overview is presented in the following scheme.

Governance

Key features:

- Ownership by the management SHS individual system
- Institutional Set Up by Department of Marine and Fishery, assisted by the Local Government (Head of Villages)
- Management: technical (O&M), collection, marketing, financial and accounting by the management
- Technical Inspection by SHS supplier
- Financial Audit by the Department of Marine and Fishery

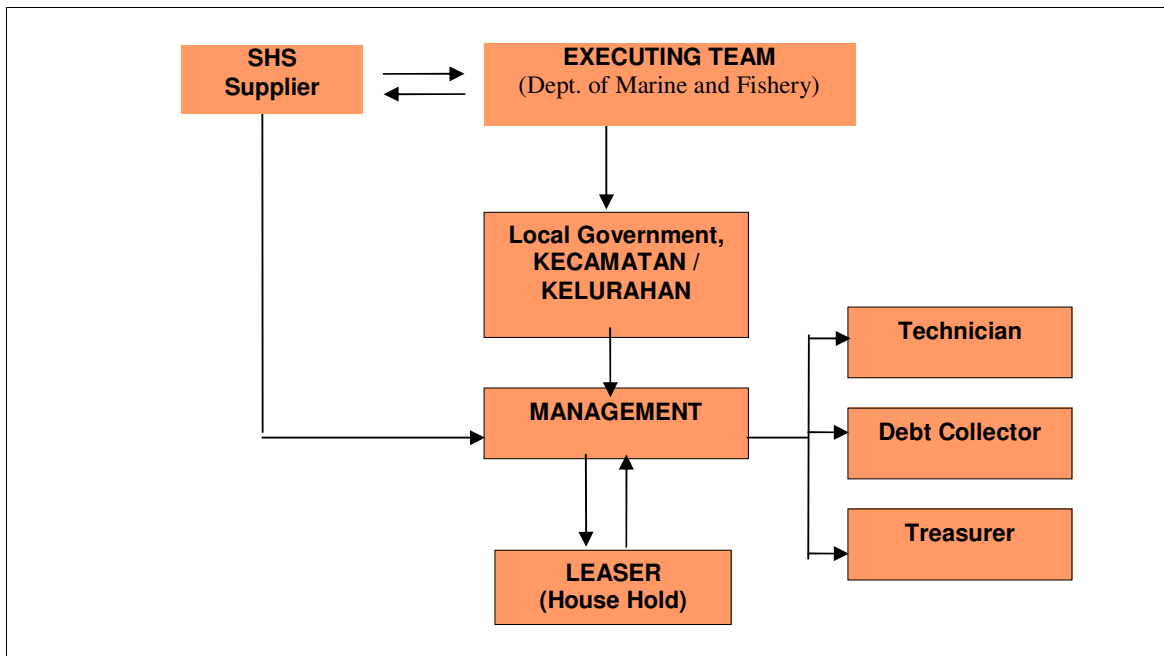


Figure 2 Institutional Arrangement for Tariff Defining - *Source: IT Power*

Social Preparation

During the preparation of the project, the Government (in this case the Department of Marine and Fishery) will identify potential locations, which are not provided by PLN's electricity within the next 10-15 years. This identification is fully supported by the Local Government (Local Department of Marine and Fishery, and Heads of Villages).

The Department of Marine and Fishery will then conduct surveys in the selected locations to directly observe the condition in the fields and to socialize with the community with support from the Local Government (Heads of Village) concerning the SHS individual system development. This will cover the issues of ownership, size of capacity, aim of usage, management system, etc.

Financial Risks

- **Technical Aspect**

- Imported components are still dominant making the PLTS system expensive
- Battery capacity needs to be improved
- The damage of PLTS usually happens at the end of the guarantee period
- Increased care is needed to maintain the operational and management sustainability of the PLTS system

- **Market Aspect**

Previous and Ongoing Development Efforts

In the past, numerous efforts have been made by both the Indonesian government and cooperatives to generate electricity using small-scale renewable energy technologies, but the results are still minimal. The Department of public works and the Directorate General for Water Resources Development have been including micro-hydro in its projects for a number of years, whenever flow and head conditions are favourable. Unfortunately, these limited attempts to exploit Indonesia's vast renewable energy potential have almost come to a complete halt, after the rural development programmes had to be suspended in the face of the country's severe economic and financial crisis.

Previous activities include:

- Department of Cooperatives – small hydro, power for households
- Department of Transmigration – PV, hybrid systems for communities
- Department of Health – PV, power for clinics
- Department of Transportation and Communication – PV, traffic signals

Financing for small-scale energy development is (even more) unavailable than before; prior to the financial crisis, banks were not lending for hydro or other renewable energy projects, because they were not familiar with the technology, and because the returns did not appear to be as high as for other investments. Currently, Indonesian and international banks are usually not willing or able to lend for any type of project.

Private energy suppliers face higher interest rates than government entities, and will prefer conventional energy options with lower capital costs, shorter payback periods and lower up-front investment cost. There is a lack of micro-credits for the rural population to purchase electric appliances other than for lighting and thus to invest in productive activities based on electricity end-use.

Annex 1 Types of SHS Projects

Depending on the type of the SHS end user the different programs can be classified as follows:

- **Medium and large-size government projects:** these are launched through a bidding process. The lowest bidder will not necessarily be awarded the project, as other criteria than only price are taken into account.
- **Small and medium-size NGO projects:** these are sold as a complete package by local or international NGOs, to be designed in collaboration with the PV-SHS traders, fund providers and other suppliers.
- **Private company projects:** these are sold as a complete package to local as well as international private companies, to be designed in collaboration with the PV-SHS traders, fund providers and other suppliers.
- **Individual PV-SHS sales:** these are retails purchased by end users through extensive distribution networks.

Annex 2 Sustainability criteria of SHS projects

This section will highlight the aspects that lead to sustainability or non-sustainability of the project, which may include the following aspects:

Technical

- Development and implementation of special business management training programs for small-scale energy project development organizations, owners and operators, to improve their managerial capabilities, especially with respect to financial administration;
- Design and implementation of technical training and capacity building programs, covering topics such as project selection, evaluation, planning;
- Promotion of the structuring of formal regional “business incubators”, where continuing technical and management advice and assistance can be provided to project developers. One target of such incubators would be entrepreneurs interested in forming operation and maintenance (O&M) contractors or project management contractors, which could provide services to several plants located in certain regions. Such organizations could provide a higher level of expertise than would be affordable for single-project O&M and management staffing.
- Design and promotion of local, village-based implementation arrangements and organizational mechanisms for effective local participation in developing and operating individual energy systems;
- Design and promotion of the implementation of incentive-based arrangements to encourage good O&M and revenue collection; and
- Formulation and promotion of private or community cost sharing models to be applied at all stages of the development and operation of small-scale energy projects.

Institutional

- Isolated system of electricity development which involved all related institutions in PPK by using local energy;
- Local capacity empowerment (Local Government and community);
- Provide support / subsidy (loan with low interest).

Financial

- Design and establishment of appropriate and sustainable financing mechanisms for small-scale hydropower projects, based on an analysis of requirements and forms of financial intermediaries available;
- Establishment of a special "revolving fund" for small-scale energy development for off-grid rural electrification. This revolving fund will grant loans for the implementation of selected hydropower schemes, and will continuously be refilled by the instalment payments of the loans. It is clear, however, that as long as Indonesia's energy sector is heavily subsidized, some form of subsidies will also be required for energy development to level the playing field with conventional energy options. Different models will be devised and proposed for testing, such as a replenishment of the revolving fund by governmental subsidies that are based on the amount of electricity actually produced by the schemes implemented with loans out of the revolving fund.
- Provision of support for the implementation of a number of small-scale energy schemes to test and demonstrate the functionality of the proposed financing mechanisms, implementation arrangements, and organizational models.
- Mobilization of both national and international resources to co-finance individual small-scale energy projects;
- Improvement of the sustainability of energy based off-grid electrification projects by promoting the development of productive end-uses for electricity, and by supporting the installation of a micro-credit facility for electrical appliances for productive end-use.

Social

- The need of socialization to the community with support from the Local Government (Head of Village) concerning SHS individual system development. This will cover the issues of ownership, size of capacity, aim of usage, management system, etc;
- The need to encourage the PLTS system socialization;
- Non-performing revolving fund since the PLTS users are not always disciplined enough;
- Improper information concerning PLTS system as would it be free of maintenance;
- Low probabilities of the PLN network reaching PPK in the next 10 years;

Market

- Stakeholder involvement is important during project selection, planning, and implementation. Active stakeholder participation is especially important for community-based systems, where the stakeholders will be managing and paying for a project upon completion. If stakeholder involvement is neglected, the project acceptance and sense of ownership by the stakeholders is often low, resulting in short project lifetime;

- Many institutions and decision-makers are aware of the possibilities for renewable energy development. The result is often that conventional energy options are preferred, even where the potential for hydropower would be promising;
- Regional government involvement in development of decisions is becoming increasingly important as increased local autonomy is implemented. Up to date, however, there is little understanding of the electric business at that level.

Annex 3 Mission Report Indonesia 21-31 January 2007

• MISSION DATA:

Mission Location : Jakarta
Mission Dates : 21st January 2007 to 31st January 2007
Mission Staff : Laure Anquez-Pascale Geslain: **PlaNet Finance**
 Katerina Syngellakis: **IT Power**
 Jean Christian Marcel: **Transenergie**

• MISSION OUTCOME:

1. **Mission outcome 01** : Launch of RendeV project with the European partners and meet the local partners to validate the engagement of the project
2. **Mission outcome 02** : Present RendeV to the different Indonesian stakeholders
3. **Mission outcome 03** : Identity the main RE projects, actors, constraints and opportunities
4. **Mission outcome 04**: Identity new partnerships possible and local financial supports.

• PEOPLE MET:

Detail/Organisation	Participants	Position	Phone
TENESOL	Mario	Engineer	62 811 929 826
Ministry of R&D	Adjat + Eddy	Engineers LSDE & BBPT	62 21 316 9750
UKABIMA	Aldius Taher Phera T. Ukur	Business Development Manager Training Manager	62 21 7247 257
BPPT	Andhika Prastawa Hamid Budiman	Head of energy conversion tech division Staff Engineer	62 21 316 9750
European Delegation	Thibaut Portevin	Prog Manager Environment	62 21 2554 6200
Mission Eco	Jean-Charles Rouge Marie-José Michel	Attaché Commercial Attachée Commerciale	62 21 570 16 68
GTZ	Dr. Alfred Hannig Dr. Michael Hamp	GTZ Principal Advisor for Sustainable Economic Reform GTZ Advisor	62 21 386 63 84
USAID	Richard Hough	Director of Programming	62 21 3435 9000
TOTAL	Mohammad BERLI	Head of Communication	62 21 523 1907
Bina Swadaya	Yussef Ari Hadi Didit Wijayanto	President Director Director	62 21 4586 1204 62 21 4255 354
MAMBRUK	M. RASPATI	Director	62 81 2967 4732

Pelangi	Nyoman Iswarayoya	Programme manager	62 21 7280 1172
YBUL	Yani Witjaksono Diyanto Imam Lolo M. Panggabean Hardjono Purwandono	Chair person Executive Director Director Renewable & energy Advisor - MSME enterprises	62 21 720 61 25
UNDP	Lukas Adhyakso	Programme Officer Energy & Environment	62 21 314 1308
FIELD TRIP	Eddy / Adjat		
Perbarindo	Biyanto Toto	Director - Jakarta region	08 12 818 58 18
Kharisma Perkasa Sejahtera	Bening Soegianto	Director	62 21 888 3744
MOE	Helmi Priko Nainggolan Agus Saptono	Head renewable energy business development	62 81 2924 5525
PMN	Dani Dityawan	Management Services Department Head	62 21 251 1404 08 1518 77731
ADB	Irman Boyle	Energy Specialist Consultant	62 21 251 2721
World Bank	Yoko Doi	Finance & Private sector	62 21 5299 3086
AFD	Yathay PIN	Représentant Résident	62 21 570 1668

• OPPORTUNITIES DETECTED

Name of organization	Partnership model	Level of opportunity
TENESOL		
Ministry of R&D		
UKABIMA	Few opportunities as a partner. Ukabima may be involved in the training aspects of the projects but no clear motivation from their part	Low
BPPT		
European Delegation	Despite having few energy projects managed in Indonesia, the EU delegation will provide necessary support throughout the project	Low
Mission Eco	May provide information on the project in country	Low
GTZ		
USAID	No more energy projects. Have staff whom we could meet	Low
TOTAL		

Bina Swadaya	Good partnership opportunities. They are interested in developing an energy-oriented financial product	High
MAMBRUK		
Pelangi	Very good partnership opportunities. They know the energy and environment sector well and have worked on the solar training projects in the past. Could be particularly useful for WP2.	High
YBUL	Good partnership opportunities. They know both the energy & microfinance sectors. Could organise meetings and events in Indonesia	High
UNDP	Although they are implementing a project on micro-hydro with a similar structure to ours, they do not have funding or support to provide	Low
FIELD TRIP		
Perbarindo	Possibilities to have access to the BPRs members (1575) , communicate and develop lobbying on project	High
Kharisma Perkasa Sejahtera	NGO with experience on solar home on different communities (500 materials installed) with finance supports (governments, donors), training and maintenance models. It will be interested to develop pilots with Bina Swadaya	High
DGEEU	Important minister due to it role: formulate directive Policy on Investment and Financing, Incentives Policy and Standardization. Mme Ratna Ariati is one the main player on RE on Indonesia	High
PMN	Two main opportunities detected <ul style="list-style-type: none"> • To investigate on the possibilities to use PNM training centre (existing on every 38 PNM branch) for the training plan in project • Financial model and project development: PNM has financial capacity to support solar energy project and could be interested by RE (experience on energy access loan for a cooperative (generator) 	High
ADB	ADB is not on line with our project: finance directly PP sectors and regional government. It seems not interested to finance solar energy access	low
World Bank		
AFD	AFD has a program to support post tsunami reconstruction. on loan form to BRI. No local actions identified out of this program	low

- PEOPLE OR ORGANIZATION TO MEET THE NEXT TIME:**

Organization	Person to meet	Contacts
DGEEU	Mme Ratna Ariati	
Danina (Denmark agency)	Embassade du Danemark: Inge-Marie Lorenzen,	iml01@cbn.net.id
Ministry of Environment of Indonesia)	Laksmi Dhewanthi, Kementerian	Lingkungan Hidup (Gedung A, lantai IV, Jl. D.I. Panjaitan Kav 24, Kebon Nanas - Jakarta. Tlp/fax +62 21 8517161
PT Sundrya Indonesia	Maurice Adema (Adema has developed a system of frankness for its kits solar, with large successes in Sri Lanka Adema works with NGO with the rural credit No experience in Indonesia, but would be developed	Jl. Pondok Randu No. 38, Duri Kosambi Cengkareng 11750, Jakarta Barat Tel : (+62) (21) 541-6103, 541-6104, 541-6105 Fax : (+62) (21) 541-6106 info@sundaya.com , maurice@sundaya.com
CUSNO (Olo Ningkal Sempek Credit Union), which provides micro-credit who provides microcredit in a "forest" project	?	?
VITO, a Belgium NGO who had a project on renewable energy in South-East Asia	?	?

- ACTION PLAN**

To do	Who	When
Review workpackages according to the conclusions of first mission: change actions, means and planning	Responsible of each workpackage	End of February
Select subcontractors for the different workpackages	Responsible of each workpackage	End of February
Prepare contract for each local partner	PlaNet Finance	15 th on February
Detail financial models that can be developed: fundraising, GEF, guarantee funds, UNDP, other SMP	All partners	To validate
Select location of pilot project: area, needs	All partners	To validate
Analyse reasons why former projects have failed in Indonesia	All partners	End of March
Investigate rural microfinance projects	PlaNet Finance	End of March
Detail financial cycle of a solar panel, including all costs (transport, installation, operation, maintenance...)	PlaNet Finance & Transenergie	End of March
Identify potential products to be developed: loans, energy credits, payment of maintenance	PlaNet Finance	To ba validate

• PROBLEMS ENCOUNTERED:

- Local partners planned on the Rendev contract: one is very interested (**Bina Swadaya**) but Ukabima seems not very interested and motivated. The organization is very centralized and the main decisions are taken by the Mme Adee Tiwow, the general manager, not available during our meeting in Ukabima office.
- Some solar projects developed in Indonesia with few success → important to understand the reasons before to launch pilots and financial models
- Work package have to be rethinking, in particular WP2 and 3, in order to be more efficient

• DETAILS OF MISSION

UKABIMA

Summary

Ukabima is a private company developed by CRS (Catholic Relief Services, based in Baltimore)

Ukabima owns 4 rural banks (BPR): 3 in Java (Cilicap, Sragen and Wonosan) and 1 in Sumatra (Island Bankag)

Their activities include two components:

- Lending to BPRs: they lend to 40 BPRs (including the 4 they own)
- TA to their borrowers: training, capacity building. The trainings are provided for free to their borrowers but the other participants have to pay

Synthesis of visit

Ukabima shows little interest in the project. A second meeting was cancelled and we were not able to meet the director (Mrs Abu Adee).

The presentation of their institution gave us the following information:

- Their loans to BPRs go from 300 million rupees to 1,5 billion (30 000\$ to 1 500 00\$). Loans from the BPRs are an average of 5 100 000\$. They do not have a guarantee scheme. Their rate is 16% per year. This is similar to commercial banks in Indonesia. The MFIs do a 30% interest rate to their clients. The BPR they lend to have to provide collateral.
- Their funds come from their equity and CRS
- Regarding their own BPRs: They developed their own model, called Kusuma model: group lending, close to the grameen model: only for women, groups from 10 to 20 people; they evaluate every person of the group
- Regarding MF + Energy in Indonesia: They do not know any programs linking both programs
- Regarding regions: Java & Bali are the places where there is most microfinance.

Other:

- They may be interested by Responsibility and require information on this activity

22/01 Meeting with BPPT

In BPPT (Agency for the assessment and application of Technology belonging to the Research & development Ministry) we met the Director and other engineers of the Division called: Centre for Energy Conversion and Conservation Technology.

This division is in charge of renewable energy and energy efficiency equipment R&D and certification. They work in the area of rural electrification and now photovoltaic grid connected systems, the first in Indonesia (10 kWp) has been implemented in BPPT premises (see below)



BPPT premises - Source: IT Power

Thanks to them, we have had a good overview of the place of renewable energy in the Indonesian context; plus a first list of important contacts dealing with the RENDEV objectives in the country.

A summary on the level of electrification is given hereafter:

The Indonesian Electricity State Company (PLN) estimated there are about 6224 villages throughout Indonesia will not be reached by the national electrification grid until 2004. Most of the villages are located outside the Java Island. Some of these areas are 35% in Maluku and Papua, 28% in Kalimantan, 18% in Sumatra, and 12% in West Nusa-Tenggara and South Nusa-Tenggara. The remaining are in Java and Bali (5%), and Sulawesi (2%). Assuming that an average 10,000 houses for each village, there will be at least 62.2 million houses in the isolated areas have to be electrified. In addition the existing rural electrification done by PLN is using the diesel generator

The use of photovoltaic for rural electrification has been applied to overcome the electrification problem in the rural and isolated areas. It is calculated that approximately 0.016% of the total numbers of houses throughout Indonesia have been electrified by utilizing solar photovoltaic energy.

Apart of solar energy, Indonesia is also plenty of other forms of renewable energy resources such as geothermal, micro-hydro power, biomass, wind power, and others. These resources have also been generated for the purpose of alternative electrifications in those areas.

Non-fossil Resources and installed capacity:

Non-fossil Energy	Resources equivalent	Installed Capacity
Hydro	75.000 MW	4200 MW
Mini/Micro Hydro	458.75 MW	800 MW
Biomass	1.1601 MW	302.4 MW
Solar	4.8 kWh/m ² /day	10 MW
Wind	Average 3 m/second	0.50 MW

A combination of diesel engines and renewable energy which is called “hybrid” electricity based on renewable energy is introduced. This is aimed to reduce the use of oil fuel, and simultaneously increase the service hours of the electricity to the community. The typical power capacities in the isolated areas is vary from 50 kW to 100 kW, and anticipated that the energy output of the plant is in the range 300 kWh up to 600 kWh per day. This hybrid power system can be alternative systems which offer low operation and maintenance costs. The following photo illustrates a Hybrid System in Poneo.



In the light of the above data, it is very clear that the market segment is significantly huge. There are more than 6000 rural and isolated villages need to be electrified. Utilization of renewable energy to perform a hybrid system can be considered to answer the problem of rural and isolated areas.

European Delegation

We met with the Project Manager in charge of environment. We presented the RENDEV project. Their environment projects are included under two sections:

- Development
- Economic cooperation and collaboration with ASEAN

For years 2007 – 2013: the priority areas are education and legal sector. The rest will be economic cooperation. Energy will be included in the economic cooperation. They will work with NGOs and universities, less with the government. Microfinance is not a major objective.

They will provide the necessary support for the project during the 3 years.

He suggests contacts:

CUSNO, who provide microcredit in a “forest” project

VITO, a Belgium Research institution who had a project on renewable energy in South-East Asia

French Trade mission (mission économique)

Summary

While not directly potential partners for the project, the “Mission Economique” showed an interest in the project. One of the “commercial attaché” has the energy sector in her portfolio and can provide valuable information on the energy sector in Indonesia.

Synthesis of visit

According to them, renewable energy is not a priority in Indonesia:

- There is civil nuclear program aiming at setting up a first nuclear power in 2020.
- The government is putting a strong focus on coal, using Indonesia coal reserves in Sumatra and Kalimantan.

The best contact person is Ratna Ariati for RE.

Regarding the MF sector, the government has a strong focus to develop the sector.

The best contacts are in GTZ.

USAID

Summary

Not much prospect with USAID as they have stopped all their energy projects two years ago.

Synthesis of visit

USAID completely stopped its involvement in energy projects 2 years ago. They are now focusing on:

- Basic education
- Basic services at local level (integrated projects)
- Economic growth (job creation, creating an enabling environment...)
- Democracy decentralization
- Reconstruction in Aceh

Their past projects include biomass & micro-hydro for electrical generation. They still have an energy expert (Mr Eddy Setinato) whom we could meet during our next visit.

Regarding SME, they have some programs under Aceh reconstruction. They also have partnerships with commercial banks such as Danamon, to do SME lending. Downscaling still little developed in Indonesia.

Bina Swadaya

Summary

Bina Swadaya is one of the biggest NGOs in Indonesia. "Bina Swadaya" (acronym of Badan Pengembangan Swadaya Masyarakat = Community Self-Reliance Development Agency) is a people-centered development agency managing a number of services oriented towards the development of self-reliant communities.

BS has been involved in microfinance since the 1970s with the development of self-help groups (SHG) and cooperatives, with a self-reliant, savings-first methodology. 21 branches facilitated the development of SHGs which was slowed down by a lack of capital. To respond to this capital need, BS participated to the bank - self help group linkage program (PHBK) starting in 1988, where BS recommended SHGs to banks (BPRs, BRI, Bank Danamon, Bank Budaya) and managed the disbursement of credits.

It then became involved in microbanking by establishing its own five BPRs, with a more pro-poor approach than the rest of the BPRs

From 2002, Bina Swadaya has adapted a microcredit model from ASA Bangladesh, initially in four branches, later expanded to seven branches, with technical assistance provided by ASA. Following the ASA methodology, BS set up offices as service point and living quarters for local staff. Each credit officer visits three groups per day, or 18 groups per week, serving on average 397 clients. The groups are composed of between 15 to 30 members. The credit services provided by Bina Swadaya have the following features:

- No collateral requirement
- One loan maximum per person per year
- Simple application process and documentation
- Credit is given in cash directly to borrower at the branch level

In terms of savings, deposits are collected at clients' doorsteps. Clients deposit a minimum US\$0.25 per week, are remunerated by a competitive interest rate, while saving withdrawal can done at anytime.

They now manage 5 rural banks (Lampung, Bogor, Subang, Yogyakarta and East Java) as well as 13 non-bank MFIs. They have added a money-changer activity, which allows they more flexibility in terms of borrowing in foreign currency.

Area of Operations

Bina Swadaya's microfinance program (ASA pilot) operates in areas of high density of population, in economic active regions, where transportation and market infrastructure are good, and where banking facility is available.

Clients

Bina Swadaya's microfinance program targets factory workers, small farmers (0.25 ha of land maximum), microentrepreneurs, with a household income under Rp. 1 million in rural areas, and Rp. 2 million in urban settings. Clients are vulnerable, politically, socially, and physically. In addition to the ASA model, Bina Swadaya also reaches 5,000 clients through its four BPRs and another 50,000 clients through self-help groups.

Synthesis of visit

Bina Swadaya has already been thinking about a possible financial product for access to energy in rural areas, based on solar energy. They are already in touch with a solar panel provider (Kharisma Perkasa Sejahtera).

They are interested in the project and would be a good partner for the implementation of a pilot project.

The regions they are considering are South Sumatra or Java. They would establish self-help groups in the villages of intervention. The technical maintenance would be managed by Kharisma.

YBUL

Summary

YBUL is a non-profit organization established in 1993 with focus on promoting environmentally sustainable and socially responsible business activities. YBUL was founded, in part, through financial support from Environmental Entreprises Assistance Funds (EEAF).

The followings are YBUL's current focal area:

- Sustainable Energy and Clean Technology
- Sustainable Small and Medium Enterprises
- Sustainable Biodiversity Production And Services

Synthesis of visit

The YBUL presented at length their organization and the projects they had done in the renewable energy sector.

They would be a good potential partner to implement of the local activities.

They are interested in the project, have a good knowledge of both the renewable energy sector as well as the microfinance sector in Indonesia. They have already implemented EU projects and know the financial procedures. They have organized workshops and conduct training sessions.

UNDP

Summary

UNDP is launching a project to electrify small communities. The project is focusing on micro-hydro.

There could be interactions between their project and ours in terms of organization of conference. They do not yet have the full financing for their project.

Synthesis of visit

UNDP not very active in energy sector. More than on energy, UNDP is focusing on natural resource management. They are mainly working at the policy level, however they are launching a field project.

Their project has 4 components:

- Support the implementation of a fixed rate for renewable energy purchase at the national level
- Micro-hydro technology dissemination
- Community-based micro-hydro sensitization

- Microfinancing

Budget of project: 2 million USD

2 phases: capacity-building block (3 years) and a piloting block (after that – this part not yet funded)

Targeted areas: basically any mountain area. Includes: South Sulawesi, Sumatra, parts of Java

He suggests we meet IBK, an NGO working on micro-hydro

24/01 Meeting with GTZ

GTZ are focusing on financial strengthening (through ProFi project) and sustainable economic development (no direct action on energy). The sustainable economic development component is:

- education/ vocational training
- improving efficiency, including eco-efficiency

Pro Fi looks at national and regional policies regarding banks and non-bank financial institutions. Aspects examined include:

- regulatory aspects
- supervision
- capacity building
- decentralised micro-finance

Under ProFi, 2 provinces are mainly targeted: **West and East Nusa Tenggara**. These already have about 1320 MFIs. It was suggested that this might be a good area for the RENDEV activities. GTZ and RENDEV could possibly collaborate to produce new MFI product specifically for solar energy systems purchase.

Main network covering all bank and non-bank financial institutions in Indonesia is GEMA PKN. We should talk with them. They are the national microfinance movement covering BPRs, NGOs and cooperatives. PERBARINDO are the network of just BPRs, we should talk to them. They have a publication we could put RENDEV information into maybe.

GTZ also have an SME promotion project in **Central Java** trying to attract german companies in PV and biofuels. Possibly could link with this project on SME development but not as relevant, but geographic area of Central java easier than Nusa Tenggara. Local chambers of commerce run information training days – maybe we could work with them to organise one on solar energy and/or microfinancing.

Overall GTZ seemed quite keen to team up with us to do something more integrated, combining microfinance with renewable energy, SME development, ESCOs (energy service companies), vocational training and eco-efficiency.

25/01 Meeting with Pelangi

They were involved in the Electricity Governance Initiative (WRI) funded by USAID with 6 NGOs participating. There is a report (prepared by Winrock) which he can send. There is a case study on geothermal power in Bali.

The Electricity law is inadequate at the moment. A new law was introduced but was rejected by the courts, so it has had to be retracted. So now back to the old law. So a new law still has to be implemented to open up the electricity market and make things easier for renewables.

Regulation of the Energy/Electricity sector is still a function of the Ministry of Energy. There is no independent regulatory authority.

They worked in Aceh developing information dissemination material on solar systems and renewable energy. EKONID is the German/Indonesia Cooperation that are doing work there. Other people involved are Sundaya and Winrock international (they did a project called "Renewable energy promotion for the poor" (REPOOR).

Danish embassies also involved.

COP-MOP 14 might be in Indonesia at the end of 2007. This would be a good opportunity to present the RENDEV project.

For data on income and statistics for the different regions the Ministry of Economics would probably be best. Maybe also the Ministry of Development Planning (BANAPAS). Overall, limited data are available.

Pelangi have got good experience in developing solar manuals and dissemination materials. They could be a good partner for the project, particularly to work with them to develop the solar toolkits.

25/01 Meeting with Contained Energy

His company, Contained Energy, concentrate on commercial solar energy sales for luxury villas and hotels. They do both PV and solar water heating. However, they were involved in a solar water pumping project for Clinics in Aceh.

They prefer to install a closed box battery and regulator system (which is more expensive but lasts longer). There is no access to batteries or regulator by the end-user and so it is harder to abuse the system. There is also no need for maintenance (e.g. topping up the water in the battery). Telecoms batteries last 15 years and would be a big improvement on current solar system batteries but they are 5 - 6 times more expensive. So too expensive to use in solar installations at the moment.

He says the government give away around 20 000 PV systems a year. Many of them are badly installed or have poor quality equipment. He does not think they last long. He is not interested in this kind of government contracts. There is a lot of corruption in the government solar projects.

There is a vocational school in Aceh. ATMI are Catholic Vocational Schools
Sundaya have done good work in Sri Lanka. They also work in Indonesia. We should meet with them. Contact Maurice Adama. GPS is used to track PV system locations, so technicians can then find them that way.

Also might worth speaking to EKONID.
Financing is the gap in the PV industry.

He says **Aceh or Selawesi** would be the best places for the RENDEV project activities.

22/01 Meeting with TENESOL

TENESOL (ex Total Energie) the French bigger company dealing with photovoltaic systems all around the world) has not now a subsidiary in Indonesia.

Nevertheless, one person, Mario Wiradjaja (ex responsible of the back office in Singapore, now located in Jakarta), is their representative for current businesses in Indonesia..

22/01 Meeting with TOTAL

TOTAL, the petroleum group installed from many years in Indonesia, is interested to plan some actions dealing with rural electrification in order to communicate on this aspect (a kind of sponsoring).

At that time the planned project is located near their bigger extraction zone in south East Kalimantan, but action plan is not yet defined.

A contact must be maintained for a possible help in the project for international meetings.

25/01 Meeting with MAMBRUK

Company presentation

The company is dedicated to providing renewable energy solutions, with the special focus on solar energy applications.

They nurture a long-term vision of becoming a company that devotes all its activities to providing clean energies to the world.

Their business started in 1998 as a division of P.T. Mambruk Sarana Interbuana (MSI), under the Mambruk Group of Companies. In 2001 the business was brought into a new entity and was incorporated as a foreign investment company (PMA) involving one international shareholder, Hollandia Kloos N.V., the Netherlands, and another foreign entity, the Solar Development Corporation, Virginia, and U.S.A. is joining the ownership of the company to strengthen our international partnership.

In its relatively young existence, the company has gained a major position in the solar energy business in Indonesia, thanked to our established distribution network throughout the country. It maintains good relationship with major world-class manufacturers of solar cells, modules and other relevant equipments dedicated to solar energy applications, and are intending to establish its own solar modules manufacturing unit in Indonesia in the near future.

They have developed a strong partnership with their agents and distributors by establishing a unique marketing concept called the Warung Listrik Tenaga Surya (Warlistas). These distribution units form a network of uniquely built outlet image which each is functioning as a selling and servicing unit and information centre for solar energy systems (SHS). They have now over 20 Warlistas operating in 25 Districts (called Kabupaten) in 12 provinces of Indonesia, comprising the islands of Sumatra, Java, Sulawesi, Bali and West Nusa Tenggara.

Since 1998 they have sold or installed around 10000 units of Solar Home Systems throughout the archipelago and several Solar Energy Systems for specific industries and institutions (including power installation for telecommunication system, water-pumping system, university laboratory and social facilities).

Typical Applications

Depending on the user's need and their housing situation, the SHS and Hybrid Systems series are capable of meeting all or selected lighting need of the users, including the power required to operate some typical electronic equipment such as audio/video systems, fan, computer, and refrigerator.

Powering the air conditioning systems with PV system, although quite possible, is currently not recommended, as it would require a great number of solar modules (and higher investment) to operate the system. Therefore, the Soleha HS packages are designed only to provide the power needed by typical urban homes, except for the air conditioning system.

System Features

- Mono-crystalline PV Module
- Galvanized Solar Panel and Battery Support
- Power Charge / Discharge Controller
- Power Storage with Recovery Aid unit
- Power Control Panel
- Lighting Protector
- Power Inverter
- Installation Accessories and Parts
- User's Manual

Distribution & After Sales Service

Distribution and after sales services for Soleha and other Solar PV systems are done and provided thru their established agencies uniquely named "Warung Listrik Tenaga Surya" (WARLISTA). Their Warlistas are located close to their customer throughout Indonesia.

Customers can find Warlista in North Sumatera – Batam – Riau – Bangka – Belitung – South Sumatera – Jambi – Lampung – West Java/Banten – Middle Java/Yogyakarta – East Java – Bali – West Nusa Tenggara – South Sulawesi.

Current SHS programme

Two years ago, through the BRI (the most important commercial bank of Indonesia) a SHS programme launched by UNEP has been put in place, but at the beginning the programme was not very successful due to the context of lack of modules and so increasing prices. The aim was to install 100 000 SHS, currently only 10 000 has been installed by MAMBRUK and SHELL SOLAR in whole Indonesia.

The costs of the system, installation included are now:

- 5 MRps for a 50 Wp / 12V / 70 Ah

- 8.5M Rps for a 100 Wp / 12V / 140 Ah

The client has to put a minimum down payment of 1M Rps, then a loan is given by the BRI (duration 4 years, interest rate 18%).

The UNEP contact is in Paris: Jan KAPPEN (+33 1 44 37 76 15) jan.kappen@unep.fr

The bigger difference with the former programme of the World Bank (in South and West Sulawesi) is that there is no subsidies for the system (before, 2 \$ / Wp).

Regarding the needs of rural electrification nearby Jakarta, MAMBRUK says that South Sumatra (Lampung) is better than Central Java; but they also confirm in this region the poor activity regarding micro finance.

25/01 Meeting with OPTIMAL POWER INDONESIA

This company is a new one thanks to Australian investments. It is involved in rural electrification thanks to SHS and Hybrid systems. Its aim is to produce their own devices made in Indonesia.

The big advantage of this new structure is that a lot of former or part time engineers are linked to the renewable energy division of BPPT.

On the solar energy side, it could be the better structure in order to help the RENDEV project. It would permit to facilitate linkage with Ministries without governmental contract very difficult to establish.

BPR Nova Trijaya and Perbarindo: Biyando Toto S

Summary (short presentation of organization)

BPR Nova Trijaya is one of rural financial institution, serving the middle microfinance segment.

The organization has offices in Jakarta and in all Indonesia Province

Perbarindo is an association of rural bank, with head office in Jakarta and 17 regional office in different Indonesia Province.

PERBARINDO is the main national association of BPRs, with 1.575 BPRs members, 80% operating in Java.

It is currently involved in setting new standards of performance and training development with support from GTZ and Bank Indonesia.

Synthesis of visit

Biyando Toto S, has two functions

- One is President of Nova Trijaya
- The others is President of Perbarindo.

BPR Nova Trijaya will plan to develop Apex with a national commercial bank (not mentioned). It could have some advantages

- Donors often use apex institutions to deliver funding and technical services in countries where MFIs appear too small or numerous for direct funding relationships.

- Apexes permit donors to pass the task of MFI selection to a local institution that is assumed to have the requisite skills.

Following the recommendations of GTZ (2004 report), Perarindo will plan to develop capacity and institution building in order to reach sustainability for members: rating, technical assistance, regulation and training.

Cooperation with Perbarindo could have certain advantages, due to the number of BPR members: a communication of project, in particular of conference organization, support and training could be envisaged. The president was interested by the project and we plan to be in contact.

Kharisma Perkasa Sejahtera : Benin Soegianto

Summary

Kharisma Perkasa Sejahtera is an NGO supporting poor people to access to the solar energy. The programs have 3 main goals

- Develop education and capacity building
- Promote local solar technical components
- Finance access to solar energy

Organization has developed solar program (500) in Lumpur, Aceh and Pugolo (Sumatra) East Java and Timor. The average cost of solar home is 2.500.000 Rupees (250US\$). The organization has regular contacts with government to obtain financial support for materiel.

The financial model developed y Kharisma could be:

- Installation of solar system with subside doing by government or donor
- Service plus: the households have to pay maintenance.

Synthesis of visit

Bening Soegianto estimated than a part of Indonesian people have capacity to pay (middle class): the majority on rural area are poor and need to be educated due to the new behaviours generated by electricity access. The most successful project was the implementation of solar in oil plantation. The energy access increased efficiency of the plantation.

Kharisma Perkasa Sejahtera has team (4) to train people during the installation of solar. It seems that there is no problem in the maintenance fees payment.

Bening Soegianto is very close to Bina Arta Swadaya and it is one of members or organization. We recommend having some verification with local solar providers and BPPT, but this NGO could be one of partnership to develop a pilot.

Directorate General of Electricity and Energy Utilization (DGEEU)

Summary

The mission of ministry is to guarantee the sustainable energy supply to national support, increase the added values of energy sources, provide an affordable energy for low income people and develop domestic capacities in the field of energy management

The ministry has 5 divisions:

- rural energy
- New renewable energy business
- Training and support
- Energy utilisation

The ministry of energy and mineral resources, directorate general of new renewable energy and energy conservation is in charge to

- Formulate directive Policy on Investment and Financing
- Formulate Incentives Policy
- Implement Standardization, Accreditation and Certification
- Increase Research and Development

The main policies Related to Renewable Energy are

- National Energy Policy: **(Ministerial Decree: No.0983 K/16/MEM/2004)**
- Blueprint of National Energy Management Policy: 2005-2025 (Target and Implementation Program)
- Green Energy Policy: **(Ministerial Decree: No. 0002/2004)**: Implementing the maximum utilization of renewable energy and Efficient utilization of energy
- Small Distribute Power Generation using Renewable Energy: **(Ministerial Decree: No. 1122 K/30/MEM/2002)** Developer Small Enterprises with Capacity : < 1 MW and Electricity Price by utility
- Geothermal Law: **(Law No. 27/2003)**
- Regulation on Electricity Supply and Utilization: **(Government Regulation No. 03/2005)**

Synthesis of visit

Mme Ratna Ariati is director of new renewable energy and energy conservation but she was not available and the meeting was with one of her team.

The 2025 strategic targets are to decrease strongly use of oil energy: the part of RE will be estimated to 5% of total with objectives to prioritize the utilization of renewable energy for power generation. The DGEEU is one of the main actors on the Rendev project and is regularly notified by the different local experts. We hope it will be possible to meet Mme Ariati during the next visit in Jakarta, in order to confirm with her how the DGEEU could be involve and promote the project .

PNM (Permodalan Nasional Madani)

PNM is a state-owned investment firm created in June, 1999, by the Government after the financial crisis to take over the refinancing role of Bank Indonesia and to empower and develop the SME, cooperatives and microfinance sector. PNM is the link between commercial banks and BPRs, commercial banks and non-bank microfinance providers. PNM provides loans to non-bank microfinance providers, through regional development banks (BPD), The financial assistance offered by PNM will take the form of loans and capital assistance through PNM-Venture Capital and PNM-Investment Management, affording access to the capital market. Management assistance will be provided from initial establishment and include design of business plan, financial restructuring and operational assistance. PNM maintains partnerships with research institutions throughout Indonesia, government ministries, educational institutions and active business players to develop successful businesses, applying an integrated approach. PNM has transversal relationship with minister of finance, Minister of cooperative and SME.

PNM programs:

1. Financing & Development Programs: Equity Participation, Financing Programs,, trustee for multi-lateral agencies, donors, NGOs, GtZ Disaster Relief for Aceh, Yogyakarta & Central Java, ADB Micro-finance & Innovation Fund, PLAN operator or for CSR funds (State Owned Companies, Mining, Forestry & Plantation Cos.)
2. Network creation :

3. Management Services both for the MFI's and the attendant Group and/or Real Sector activities, for strengthening business management and market development.
4. Training and capacity building : SME and microentrepreneurs

Finance supports could be launch though **apex fund** for MFIs or loans for institution supporting: more than 1000 financial supports with interest rate close to commercial rate (12-15%) and 1-5 years terms.

PNM resources

- Capital fund : Indonesian government
- Asian Development Bank (ADB): in 2002, 435 US\$ million to help finance small and medium businesses in the country. The ADB fund is used to develop foreign exchange earning businesses including fishery and agro industries such as palm oil
- ...
- Others foreign agencies.

Synthesis of visit

PNM is an important actor on the microfinance sector and could be a good opportunity on the Rendev project for two reasons:

1. Training centre in every PNM branches

The organization has training centre in Jakarta and in every branches. Currently PNM has 40 branches and affiliates:

- Non banking : 8 branches
- Microfinance : 30 branches

The training centres have large covertures on Indonesian provinces and could be use for the training plan in project

2. Financial model and project development

PNM had some background on energy. It financed loans to cooperatives to by a generator used for 500 families in a rural area .With the increase of oil, PNM is looking for solar market and will be interested to develop financial model to energy access, on the same model developed with cooperative

Asian Development Bank

ADB is a multilateral development financial institution owned by [66 members](#), 47 from the region and 19 from other parts of the world.

Asian Development Bank has different missions:

- To improve financial access to poor people in Asia and the Pacific,
- To [develop member countries](#) [reduce poverty](#) and improve the quality of life of their citizens.

Main instruments for providing supports

- policy dialogue
- loans
- technical assistance
- grants
- guarantees
- Equity investments.

ADB's annual lending volume is typically about \$6 billion, with technical assistance (about \$180 million a year). ADB provides project lending assistance based upon the following topics

- economic viability, technical feasibility, and financial soundness
- effect on development activity in the country concerned
- contribution to the removal of economic bottlenecks
- capacity of the borrowing country to service additional external debt
- introduction of new technologies to raise productivity
- expansion of job opportunities
- strengthening of institutions according to criteria of good governance
- integration of environmental and social considerations into ADB projects

Synthesis of visit

ADB finance directly regional government, public and private sector: it never financed directly energy access for community development and has a low interest in the Rendev project. We maintain the contact in case of strategic change and development of new financial instrument.

AFD

Summary

“L’agence française pour le développement” (ADF) has a permanent office in Indonesia to manage the Post-tsunami program.

The natural catastrophe had completely destroyed the activities of SME businesses that made up the majority of the corporate fabric in the Banda Aceh zone (north), especially in the of agriculture, fishing and trade sectors. The AFD provided 20 million euros in aid for the financing of loans to 2,000 small businesses in order to re-launch economic activities. The BRI will receive a concessional loans from AFD.

Synthesis of visit

The AFD office is very small and manage the post Tsunami reconstruction loans. The permanent representing informed us the existing of strong competition between donors in Banda Aceh and organization as AFD providing loans.

The loan will be transferred to the BRI and we think it will be not possible to receive financial support from AFD, out of Aceh, but we keep in touch.