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D22 Final Strategy Paper

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The RENDEV project

The RENDEV project aims to explore ways to link microfinance and access to renewable energy, bringing a positive contribution in rural development and poverty alleviation in Bangladesh and Indonesia by increasing access to solar energy, the development of micro enterprise, and the provision of microfinance mechanisms tailored for low income people's needs.

The project started in January 2007 and will last until December 2009. RENDEV is financed by the European Commission under its Intelligent Energy line.

The main objectives of the RENDEV project are:






-  To promote development of income generating activities with renewable energy supply;
-  To identify measures justifying involvement of Small and Medium Sized Enterprises in the solar energy sector;
-  To build synergies between the microfinance sector, the renewable energy sector and the micro enterprises in Bangladesh and Indonesia;
-  To better inform stakeholders providing pro-poor sustainable renewable energy services;
-  To bring a positive impact on the quality of life in rural districts.

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Executive Summary

In Indonesia, 70 to 90 million people, most of them living in rural areas, still lack access to electricity. Renewable energy, and solar energy in particular, has been identified as a solution with a high potential for the electrification of remote rural areas in the country, and ambitious targets have been set up by the Government to promote REN technologies.

In the past decades, the Gol has implemented various programs to promote solar energy access. However, these programs were based on financial models that were not adequate enough, and their weaknesses prevented the successful expansion of solar energy technologies in the country.

Building on the findings of all its studies, RENDEV recommends two different financial models that would be adequate for promoting solar energy access in Indonesia which are detailed in D16 – financial model:

- **SCENARIO 1:** Replicate the successful Bangladeshi IDCOL model, adapting it to the Indonesian context. In this model, microfinance institutions have a major role to play in facilitating solar energy access by offering adapted financial products (credit schemes). To do so, they will need strong financial and technical support.
- **SCENARIO 2:** To reach poorer populations, improve the Indonesian social pay-for-service model. In this model, MFIs will not play a direct role in financing solar energy access, but they can be mobilised to facilitate fee collection and stimulate local development of rural areas in link with electrification.

These models should first be tested at a small-scale (in one selected province for instance), through a pilot program, before scaling up can be planned at the country level.

RENDEV Indonesian partners are taking the lead in making this implementation happen and are currently developing proposal in that sense. Thus they will pilot test at the Kabupaten, then at the provincial level, financial models prior to their replication throughout the country.

For a sound application at the national level, and an effective replication of solar energy program on the basis on these financial models, RENDEV further provides the following recommendations:

- **An adequate subsidy policy should be designed** in order to bridge the gap between the full cost of the solar technologies and the willingness and capacity to pay of the populations. This subsidy policy should be long term, universal, carefully designed and adjusted to the varying willingness and capacity to pay of target populations according to areas' characteristics and equipment types.
- A particular attention has to be paid to the specification of the **respective responsibilities of all the actors** within the financial schemes. Indeed, all actors should be aware of and clear about their role and responsibilities. Transparency, coordination and communication will be essential to the success of the program.
- A successful national solar energy program is one that will be **stable and operating in the medium and long term** in order to effectively reach a significant population. In this aim, the sustainability of the financial model should be ensured at various levels: institutional, financial, technical, social and environmental.
- Potential role of provision of adequate financial services can play in link with rural electrification goes beyond financing the mere access to solar energy technologies. **Appropriate financial services can also support the diffusion of technologies**, as basic as any electrical appliance or post harvest machines that help rural populations take advantage of the new business opportunities created by electrification.

List of Abbreviations

BKD	Badan Kredit Desa (<i>Village Credit Boards</i>)
BPD	Provincial Bank of Development
BPPT	Agency for the Assessment and Application of Technology
BPR	Bank Perkreditan Rakyat (<i>People's Credit Bank</i>)
BRI	Bank Rakyat Indonesia
CBO	Community-Based Organization
CDM	Clean Development Mechanism, for carbon credit acquiring (United Nations)
Commission	European Commission
GoB	Government of Bangladesh
GoI	Government of Indonesia
IDCOL	Infrastructure Development COmpany Limited
IDR	Indonesian Rupiah, national currency in Indonesia (USD 1 is about IDR 9,100)
KUD	Koperasi Unit Desa
MFI	Microfinance institution
NGO	Non-Governmental Organization
PLN	Perusahaan Listrik Negara (<i>Electricity Company of Indonesia</i>)
PV	Photovoltaic
PO	Partner Organization
REN	Renewable Energy
REREDP	Rural Electrification and Renewable Energy development Project
RES	Renewable Energy Sources
RES-E	Electricity generated from RES
SHS	Solar Home System
TPSP	Tempat Pelayanan Simpan Pinjam (<i>Savings and Credit Service Posts</i>)

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1 Introduction

In Indonesia, 70 to 90 million people, most of them living in rural areas, still lack access to electricity. Renewable energy, and solar energy in particular, has been identified as a solution with a high potential for the electrification of remote rural areas in the country, and ambitious targets have been set up by the Government to promote REN technologies.

The microfinance sector is well developed in Indonesia, with over 50,000 microfinance institutions (MFIs) operating and a gross loan portfolio ranking as the highest in the world. Microfinance could thus play an important role in promoting access to solar energy in the country. In order to do so, Indonesian MFIs would however still require strong financial and technical support to develop adapted financial services in rural areas.

Previous studies done under the RENDEV project have already allowed reviewing the strengths and weaknesses of Indonesian and Bangladeshi solar energy experiences, identifying the needs and markets for REN technologies, and assessing the potential role of microfinance institutions in both countries.

Building on the findings of these studies, this report seeks to provide recommendations on financial schemes that could effectively promote solar energy access in Indonesia, on the role of microfinance within these schemes, and on the different steps that should be taken to design and implement an adequate national solar energy program on the basis of the recommended financial models.

2 Context

Main ideas:

Electrification situation

Around 70 to 90 million Indonesians still do not have access to electricity. 80% of them live in rural areas.

Because of geographic and financial constraints, 6,000 villages will not be reached by the national electricity grid in the near future.

Renewable energy, and in particular solar energy, has a high potential in Indonesia, and could be a solution to the electrification of rural, remote areas.

Microfinance situation

Microfinance is a well-developed sector in Indonesia, but it still lacks access to capital, especially for providing financial services to rural areas.

If financial and technical support is provided, microfinance institutions can play a key role in facilitating access to solar energy through adequate financial services.

Previous studies undertaken through the RENDEV project assessed current energy needs and the state of microfinance development in Indonesia (*D8 – Needs assessment analysis and market feasibility for solar energy applications, Indonesia; D14 – Identification of Microfinance Institutions, Indonesia*). A brief summary of their findings is provided here as a reminder of the context of electrification and microfinance in the country.

2.1 Electrification situation

2.1.1 Electrification needs in Indonesia

Indonesia still has one of the lowest rates of electrification in the region. The current ratio of electrification is estimated to range between 57% (based on data from PLN, the state-owned Electricity Company) and 88% (based on a survey conducted by BPS, the National Statistics Agency). This means that **around 70 to 90 million Indonesians are still left without access to electricity**, among which 80% live in rural areas and over 50% outside of Java-Bali islands.

Access to electricity is essential to respond to the needs of the poor, improve their standards of living and enhance local economic development. In this perspective, the Government of Indonesia (GoI) has set up a high priority on electrification in its development agenda, with a **target of 90% of the households to be electrified by 2020**.

2.1.2 Grid expansion and limits

Over the past three decades, the GoI has allocated considerable resources to its rural electrification programs. This was done mainly through the Indonesian Electricity State company: Perusahaan Listrik Negara (PLN). For about two decades from 1978, PLN has shown impressive record of aggressive expansion of main grids, as well as development of new small grids in the rural and remote areas mainly using diesel power plant system.

However, in a country with roughly 17,500 islands and a length and width of 5,000 and 1,800 km, extending access is an increasingly difficult task. Outside of Java-Bali, PLN cannot be financially sustainable if applying its current universal tariff structure (TDL). In consequence, PLN strategy in these regions is limited to minimizing losses, and not to maximizing outreach. Moreover, PLN is currently experiencing financial difficulties which make it unable to expand its power generating capacity and perform significant progress in rural electrification.

Today, the available grid interconnection in Indonesia is restricted to the Jawa and Bali Islands, while other islands such as Sumatera, Kalimantan, Sulawesi and Papua are not connected yet, and still isolated on each island. Figure 1 illustrates the current and envisioned electricity network in Indonesia.

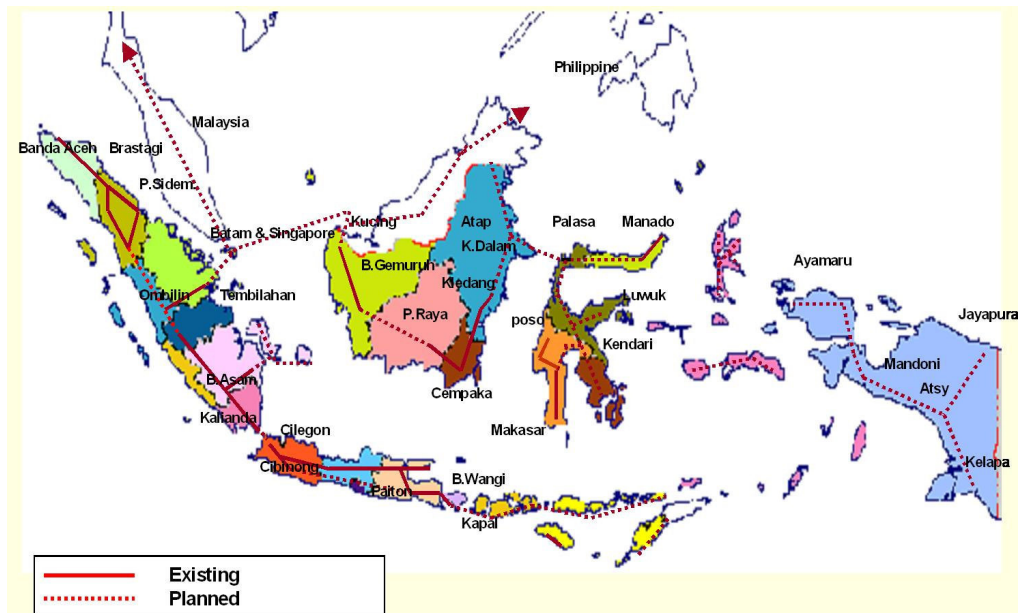


Figure 1: Existing and planned electricity network in Indonesia (Source : BPPT)

PLN estimated that there are **over 6000 villages throughout Indonesia which will not be reached by the national electrification grid in the near future**, due to their remoteness and the scattered pattern of their houses.

Most of these villages are located outside of Java:

- 35% in Maluku and Papua,
- 28% in Kalimantan,
- 18% in Sumatra,
- 12% in West Nusa-Tenggara and South Nusa-Tenggara,
- 5% in Java and Bali
- 2% in Sulawesi.

Assuming an average of 10,000 houses per village, there are at least 62.2 million houses in isolated areas that will not be reached by the national grid in the near future.

Providing access to rural areas can no longer rely entirely on conventional power generation technologies through grid expansion. Novel and diversified ways are now required to bring electricity/modern energy to remote and poor regions, to fit the specific geography of the country and the specific social conditions of the communities.

2.1.3 Renewable energy potential

Developing renewable energy access can address the electrification problem of rural and isolated areas. **The potential for renewable energy** (solar, wind, hydro, biomass, geothermal, ocean) **is very significant**. The potential for solar energy, in particular, is major: the whole territory of Indonesia indeed receives an **average solar irradiation of 4.8 kWh/m².day**.

However, the use of renewable energy for rural electrification has been limited so far. Photovoltaic (PV) energy represents approximately 0.016% of the total numbers of houses throughout Indonesia. This can be partly explained by the government fuel subsidy, which has encouraged households in remote areas to adopt diesel powered generators. Without subsidy, the choice of technology would surely have been different, as renewable energy turns out to be more economical and sustainable in the long run.

In order to decrease its oil dependency and expand rural electrification, the **Gol has set up ambitious targets to promote the development of renewable energy**:

- Renewable energy should represent 15% of the Indonesian energy mix by 2025.
- 880 MW of solar PV should be installed by 2025.

Today, only 12 MW of solar PV are installed. The gap implies that Indonesia needs to install 58 MWp per year to meet its target.

In this perspective, the Gol has allowed a budget increase for the past 3 years. In order to use resources in an efficient way and to effectively reach the targets, the Gol has to develop relevant policies and set up adequate incentives to promote the adoption of solar energy technologies. The **design and implementation of a sound financial model for solar energy access** is therefore essential.

Next steps for Indonesia:

Identify a relevant financial model that can successfully promote access to solar energy technologies in Indonesia.

Define how microfinance could fit in such a model.

3 Recommendations

Rural electrification is still an acute problem in Indonesia: 70 to 90 million inhabitants, most of them living in rural areas, still lack access to electricity in the country. Renewable energy, and solar energy in particular, has been identified as a solution with a high potential for the electrification of remote rural areas, and ambitious targets have been set up by the Government to promote REN technologies.

In the past decades, the Gol has implemented various programs to promote solar energy access. However, these programs were based on financial models that were not adequate enough, and their weaknesses prevented the successful expansion of solar energy technologies in the country.

Throughout the RENDEV project, various studies have been done to review the strengths and weaknesses of Indonesian and Bangladeshi solar energy experiences, to identify the needs and markets for REN technologies, and to assess the potential role of microfinance institutions in both countries. The lessons learned are summarized in table 1 below extracted from *D16 – Financial model*, a report that exposes extensively the recommendations of the RENDEV project.

To design an effective national solar energy program on the basis on these financial models, RENDEV further provides the following general recommendations:

- **An adequate subsidy policy** should be designed in order to bridge the gap between the full cost of the solar technologies and the willingness and capacity to pay of the populations. This subsidy policy should be long term, universal, carefully designed and adjusted to the varying willingness and capacity to pay of target populations according to areas' characteristics and equipment types.
- It is essential to **identify relevant Indonesian and international actors** and to specify their respective responsibilities within the financial schemes. Indeed, all actors should be aware of and clear about their role and responsibilities. Transparency, coordination and communication will be essential to the success of the program.
- A **successful national solar energy program** is one that will be **stable** and operating in the **medium and long term** in order to effectively reach a significant population. In this aim, the sustainability of the financial model should be ensured at various levels: institutional, financial, technical, social and environmental.
- It is important to keep in mind that the role that **adequate financial services** can play in link with rural electrification **goes beyond financing the mere access to solar energy** technologies. Appropriate financial services can also be promoted to support the development of REN suppliers' activities in Indonesia and to help rural populations take advantage of the new business opportunities created by electrification.

3.1 Weaknesses of past Indonesian programs and recommendations of Rendev

Table 1: Weaknesses of past Indonesian programs and recommendations of Rendev

Weaknesses of past Indonesian financial models	Main causes	Recommendations
<p>Limited outreach</p>	<p>Target populations: poor rural households cannot afford a fully commercial scheme, and largely remain out of the reach of adapted financial services.</p> <p>Fully subsidized scheme: very costly, outreach is quickly restricted to available government budget</p>	<p>Find an equilibrium between commercial financing and subsidy for promoting access to renewable energy:</p> <ul style="list-style-type: none"> ▪ Avoid fully-subsidized financial schemes ▪ Develop adapted financial services (leasing, loans) for rural populations. Introducing microfinance for solar energy access can contribute to scale up rural electrification without requiring such a high level of subsidy.
<p>Unequal access</p> <p>Access to the social PV program is limited to the target populations that have been selected by government departments. Social jealousy can spread amongst the part of the community which was not chosen, and result in interferences with the deployment of the project, even to the point of inflicting damages to the material. The process and procurement procedures can also be prone to corrupt practices.</p>	<p>Fully subsidized scheme: selection of a limited number of target beneficiaries</p>	<p>Adopt a universal policy:</p> <ul style="list-style-type: none"> ▪ Promote a financial scheme that will not select beneficiaries according to some eligibility criteria, but rather adapt the subsidization rate according to well-defined and transparent criteria (setting an incentive where it is needed, at the level it is needed). ▪ Lower the overall level of the subsidy so that more households can benefit from the policy. ▪ Include all stakeholders (MFIs, technology providers) as eligible partners in the policy as long as they meet minimum standards requirements.
<p>Ownership issue</p> <p>As the SHS were given for free, there was no sense of belonging. The systems were considered as entirely government funded and taken for granted. In consequence, they were not taken care of as well as if they had been the user's own system, and compensations for maintenance were difficult to obtain from users.</p>	<p>Fully subsidized scheme</p>	<ul style="list-style-type: none"> ▪ Make end-users become the effective owners of the SHS: experiences in Bangladesh, Sri Lanka, Indonesia, India and on other continents have shown that the occurrence of defaults on the system is lowered down significantly as soon as the beneficiaries own the system. RENDEV recommend that the ownership of the system be transferred to the end-user through leasing or loan financial schemes. In both cases, the beneficiary is the direct owner of his system and he pays a regular instalment. Consequently, the family is very interested in the proper functioning of the system and pays a lot of attention to its maintenance. ▪ Require minimum down payments in line with the ability-to-pay of end-users. Down payments can both signal the initial commitment of the beneficiaries (moral guarantee) and act as an incentive for the borrower to repay following instalments and maintain the system.

Weaknesses of past Indonesian financial models	Main causes	Recommendations
<p>Lack of commercial market</p> <p>The free SHS approach affected the development of a commercial market for solar energy. Less than 20 suppliers are currently involved in PV business, only 2 are dealing with commercial retail market and offering after-sales services. Government programs have a commercial approach and tended to negatively affect private sector initiatives. Thus, dedicated sales and distribution networks have not been adequately developed.</p>	<p>Fully subsidized scheme inducing market distortion</p>	<p>Promote the development of a commercial solar energy industry:</p> <ul style="list-style-type: none"> ▪ By avoiding fully-subsidized financial schemes ▪ By defining a durable, reliable, policy framework that ensures the validity of a multi-year business model for private investors. ▪ And by assisting SHS distributors to gain access to financial services in order to increase their working capital. Linkages can be facilitated between REN developers and commercial banks with the support of the donor community, benefiting of the financial tools provided by ADB, KfW and others.
<p>No credit facility at the SME level</p> <p>The banking sector is reluctant to engage in financing rural electrification and REN projects for the following reasons:</p> <ul style="list-style-type: none"> - Unreasonably high perceived risks toward these types of projects; - Limited access to equity financing. 	<p>Credit risk</p> <p>National policies on lending</p>	<ul style="list-style-type: none"> ▪ Set up guarantee funds to reduce the perceived risks towards those types of projects. Such tools are already available in Indonesia. ▪ Set up credit lines / provide soft loans to financial institutions to somewhat reduce the cost of lending in rural areas. Such credit lines can be sought in the donor community.
<p>No credit facility at the household level</p> <p>To purchase SHS for rural households: the full subsidization of SHS has not encouraged financial institutions to develop financial products and services adapted to solar energy access (no existing market).</p> <p>The banking sector can also be reluctant to engage in financing rural electrification and REN projects for the following reasons:</p> <ul style="list-style-type: none"> - 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; - Incapability of rural people to meet bank requirements on additional collateral; - Limited access to equity financing. 	<p>Fully subsidized scheme</p> <p>Remoteness of target villages and populations</p> <p>Lack of infrastructure</p> <p>Credit risk</p> <p>Lack of MFIs reaching remote rural places (existing MFIs are mostly operating in the urban centers of rural areas).</p>	<ul style="list-style-type: none"> ▪ Develop a rural microfinance in Indonesia ▪ Design, test and implement innovative schemes to provide financing solutions at the village level by leveraging existing organizations in the community. ▪ Reinforce the capacities of the Rural Banks and build showcases that will encourage the owners of the banks to shift from their traditional urban customer base to farmers and fishermen.

Weaknesses of past Indonesian financial models	Main causes	Recommendations
<p>Cost of fee collection</p> <p>Government programmes were initially well designed in that they had defined monthly fees to cover operating and maintenance costs of the systems. However, because of the high costs of operating in remote and hilly areas with a disperse population, fees were not collected. In consequence, the sense of ownership was low, no maintenance services could be provided, and the systems quickly started to break down.</p>	<p>Remoteness of target villages and populations</p>	<ul style="list-style-type: none"> ▪ Piggyback on microfinance providers networks already located in the area to reduce the costs of recovering loan instalments and fees: develop innovative community based collecting schemes with the existing BPRs, cooperatives and BRI network.
<p>High cost of service centers</p> <p>In low-density, remote areas, the number of consumers in one central location is usually insufficient to fund service centre costs. This is why there is a lack of maintenance service centres in Indonesia. SHS are not repaired and remain non-operational. This lack of service centers threatens the sustainability of solar energy provision.</p>	<p>Remoteness of target villages and populations</p>	<ul style="list-style-type: none"> ▪ Support microentrepreneurs' activities for SHS installation and maintenance ▪ Set up training centers for SHS installation and maintenance ▪ Collect maintenance fees from end-users for each maintenance and repair intervention
<p>Lack of maintenance skills</p> <p>As people do not know how to correctly operate and maintain the SHS, systems are likely to break down and become useless. People may then stop paying fees on the non-operating systems.</p>	<p>Lack of awareness and capacity of end-users for operation and maintenance</p>	<p>Train end-users on basic operation and maintenance practices</p>
<p>Inappropriate use of the systems</p> <p>In developed market regions such as West Java and Lampung, some potential consumers seemed to have unreasonably high expectations of the SHS. The risk is then that people overuse the systems and accelerate their deterioration through an inadequate use.</p>	<p>Lack of awareness of end-users on system capacities and limitations</p>	<p>Raise awareness on the capacities and limitations of the technology, and on its appropriate uses.</p>
<p>Quality issues</p> <p>Despite the definition of accreditation standards by the Government, the product quality often did not fulfil common technical standards (e.g. in Aceh and South Sumatra). Systems often ended up breaking down quite quickly. End-users would thus refuse contributing to maintenance fees. The lack of quality thus threatens the sustainability of solar energy provision.</p>	<p>Quality standards supervision and monitoring</p>	<p>Ensure the implementation of sufficiently high and strict national standards and certification procedures to guarantee the quality of the systems provided</p>

Building on the findings of all these studies, RENDEV recommends two different financial models that would be adequate for promoting solar energy access in Indonesia and which are described in *D16 – Financial model*:

- *SCENARIO 1: Replicate the successful Bangladeshi IDCOL model, adapting it to the Indonesian context. In this model, microfinance institutions have a major role to play in facilitating solar energy access by offering adapted financial products (credit schemes). To do so, they will need strong financial and technical support.*
- *SCENARIO 2: To promote productive uses of energy, improve the Indonesian pay-for-service model. In this model, MFIs will not play a direct role in financing solar energy access, but they can be mobilised to facilitate fee collection and stimulate local development of rural areas in link with electrification.*

These models should first be tested at a small-scale (in one selected province for instance), through a pilot program, before scaling up can be planned at the country level.

However, all those actions recommend the support of the whole global chain, working on the demand side as well as on the supply side.

Main ideas:

The role that adequate financial services can play in link with rural electrification goes beyond financing the mere access to solar energy technologies.

Appropriate financial services can also be promoted to:

- 1) support the development of REN suppliers' activities in Indonesia
- 2) take advantage of the opportunities created by rural electrification and support the development of income-generating activities in rural areas.

3.2 Supporting the REN supply side

Financing facilities should also cover the 'supply side' of the PV business chain. It should provide dedicated vendors, system integrators, local component manufacturers and after-sales service providers with means to make their operations viable and worthwhile to sustain.

Up to now, in Indonesia, the REN supply side has not been able to develop its activities due to the market distortion induced by past government fully-subsidized programs and the lack of access to financial services.

Yet, supporting the supply side would bring various benefits:

- Increased working capital will enable REN suppliers to adequately **respond to increasing demand** and to offer 12 or 24 month credit schemes (which will be better adapted for market development).
- Developing the REN sector will **create job opportunities and support local development**. Local technicians can for example develop their own business as maintenance service providers.
- Supporting the development of local businesses for REN **maintenance and repair** will contribute to **enhancing the technical sustainability** of the solar energy equipment and thereby reduce credit risk.
- Development of a commercial REN sector, with an increased competition between suppliers and eventually a local production of material, can enable economies of scale, optimize operating costs of the industry, and thus **decrease the cost of solar energy equipment** while still ensuring that quality is produced.

In order to support the development of adapted financial products for REN suppliers, it may be necessary, in a first time, to set up specific credit lines and/or guarantee schemes.

3.3 Leveraging electrification benefits by supporting the development of income-generating opportunities in rural areas

A REN program brings electricity to remote, rural areas. Beyond increasing standards of living, **electrification also create new opportunities for income-generating activities.**

Thanks to extended hours of business activities, electrification first enables microentrepreneurs to increase their existing activities (handicraft, night markets, night activities such as those linked to beauty care, etc.).

Second, electrification brings the opportunity to add value to existing agricultural productions, by enabling the use of upgraded technologies for transformation and conservation activities for instance (e.g. through the use of multifunctional platforms or cold generators).

And third, electrification can create opportunities for new businesses. In the particular case of Solar Home System, RENDEV has identified that the following activities could be developed: mobile phone charging station, community TV, TV and radio as marketing tools for restaurants, etc.

Microfinance can have a strong role to play in villages that gain access to solar electricity **by helping people take advantage of these new business opportunities.** Beyond the mere access to electricity, it is the whole local economy that can be fostered.

Furthermore, if people see that their current activities (agriculture, livestock, transformation and conservation, handicraft) can gain from access to electricity, they will be more likely to invest in REN technologies and they will pay greater attention to the good care and maintenance of their equipment. Demonstrating the clear economic benefits of electrification is thus important to ensure the success of a national solar energy program.

Opportunities should therefore be identified by the national program and promoted during awareness raising campaign and end-user training, in order to deepen the impact of the program on the rural economy by generating additional sources of income for the communities. **The development of microfinance services in remote, rural areas should be strongly promoted** in this perspective.

Next steps for Indonesia:

Promote the development of financial services that will support the development of REN suppliers' activities.

Support the development of microfinance services in rural areas in order to help rural populations take advantage of the new business opportunities brought by electrification.

4 Next steps for Indonesia

4.1 SCENARIO 1: Replicate the IDCOL financial model

4.1.1 Adapting the IDCOL financial model to Indonesia

RENDEV first suggests that the IDCOL financial model (described in D16 – p 9-12) be replicated in Indonesia, adapting it to the national context.

The Bangladesh national solar program had been designed very carefully by donors, in order to systematically provide an answer to all the lessons learned from former experiences and continuous discussion between all partners. It is worth noting here that the **IDCOL financial model also provides answers to the lessons learned from past Indonesian experiences** (as detailed in table 1).

The GoI could thus learn from Bangladesh experience. In order to share knowledge on good practices and transfer competences, RENDEV therefore suggests that exchange visits, training sessions and/or discussion forums be organized between Indonesian and Bangladeshi stakeholders.

It is of course essential to keep in mind that the **IDCOL financial model** cannot be replicated as it is, but that it **should be adjusted to the Indonesian context**. In this perspective, the GoI must take the time to gather stakeholders and identify how the model can be adapted to best fit Indonesian needs and resources.

D16 – Financial model provides elements to design a subsidy policy, to define microfinance products and to specify actors’ role according to the particular context of Indonesia.

Table 2 - Idcol program at a glance

IDCOL program at a Glance	Strengths of the program
19 Partner Organizations	The unique solar program in the country
350,000 SHS installed since 2002	A strong design and solid framework based on decades of lessons learnt
20,000 + systems installed monthly	A commercial approach at the grassroots
800 service centers countrywide	A steady commitment of the donors to ease the financing
7000 + direct employments created	The dedication of the Partner Organizations over the years
	The constant adaptation of the model and inclusion of newer technologies under a single program umbrella

4.1.2 Opportunities and threats for IDCOL model replication

There are very positive **opportunities** for developing an effective solar energy program on the basis of the IDCOL financial model in Indonesia, but as well **important differences with the Bangladesh context**, which could constitute significant constraints or threats to the replication of the model:

Table 3 - Opportunities and Threats for the adaptation of IDCOL model

Opportunities	Threats
<ul style="list-style-type: none"> • Commitment of the Gol to the development of REN and especially solar. • Interest of policy makers at the local level in Provinces and Kabupaten (Districts) and their strong commitment in providing energy access to their fellow citizens. • The decentralized policy which gives budgets and structural tools, such as financial arms (BPD, Province Development Banks) to the local policy makers. • REN are on the top of the priority of the donor's community in Indonesia and are embedded in the Climate Change Program Loan • New agenda of the Renewable Energy Society of Indonesia (METI) and their will to promote semi-commercial approaches. • Growing strength of the microfinance sector and their strong interest to venture in provision of renewable energies. • Indonesian communities are significantly wealthier than Bangladeshi's, which mean a potential larger penetration in each village. • Leverage mobile banking technologies, including money transfer to reduce significantly operation cost. • The large experience gained by the different Gol agencies and the current market segmentation. 	<ul style="list-style-type: none"> • Priority of Gol might go to large scale programs such as giant solar power plant (several MW) and occult small scale decentralized initiatives. • Experiences and skills of local policy makers and agencies are lower than international standards and will require extensive capacity building to manage comprehensive projects. • Economies of scales will be challenging to lever at the unique provincial level and an upgrading at the national level will have to be embedded in the program. • Low and sparse populations and lack of infrastructures in target area, which makes installation, operation and maintenance costs higher than in densely-populated Bangladeshi intervention zones. • The Gol is still subsidizing fossil fuel energy, which makes renewable energies comparatively expensive. • The renewable energy (REN) supply-side is not so well-developed in the country. • Past experience may have affected the image that people have about solar energy systems' reliability. • The rural microfinance sector in Indonesia is not as strong as in Bangladesh. Microfinance institutions still do not reach remote areas. They will need strong financial and technical support to be able to provide financial services for solar energy access.

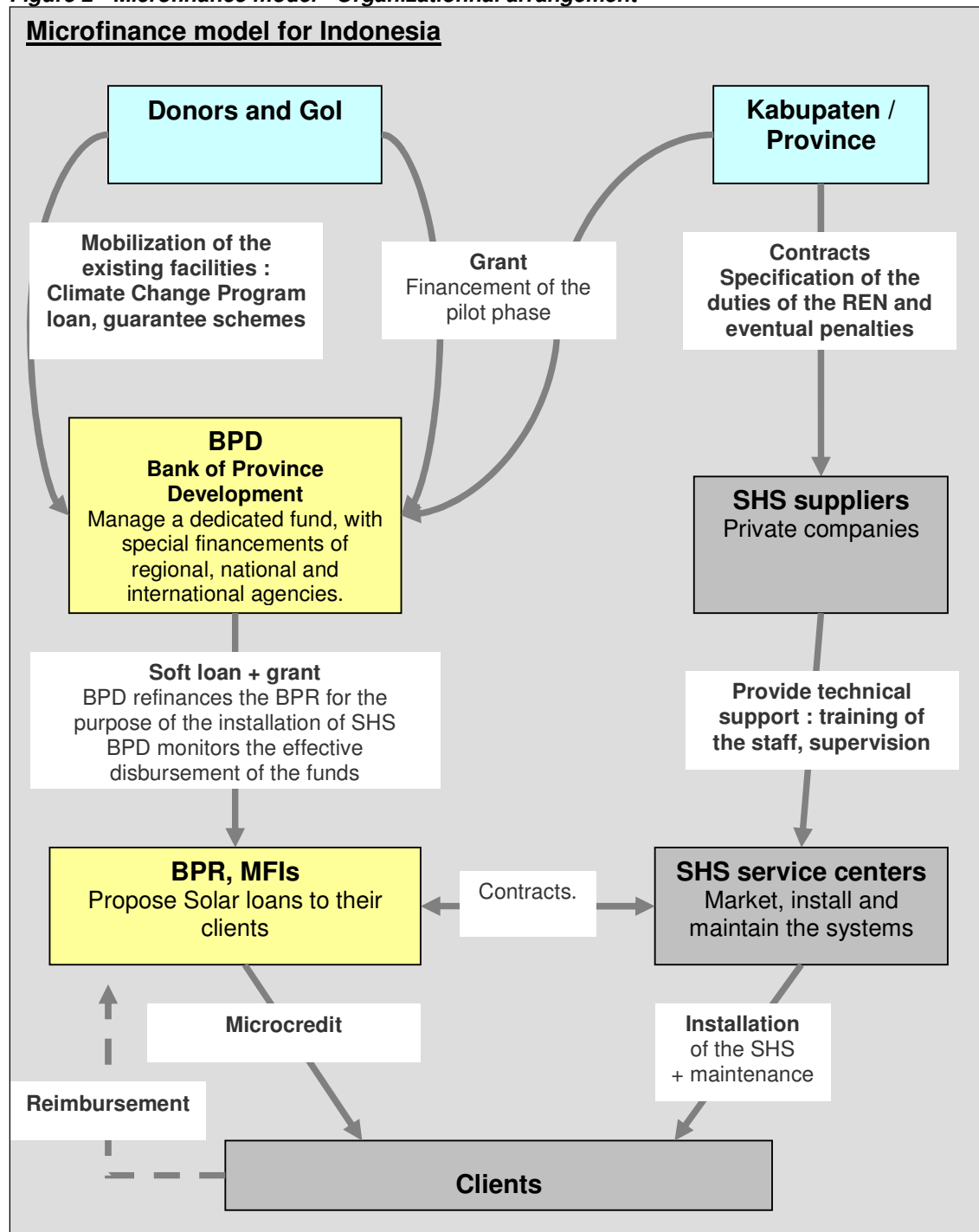
RENDEV advises that the Gol, in a first time, **tests the replication of this financial scheme at a small-scale, implementing pilot projects** in kabupaten with the highest potential for success. MFIs that are strong and have already developed infrastructures and methodologies in rural areas could be targeted as privileged partners for this pilot testing phase (e.g. MBK microfinance institution in Java). If the small-scale replication of the model succeeds, scaling up could then be planned in a second phase.

The partners of RENDEV, METI and YBUL are working on the application of the following type of scheme.

4.1.3 Organizational and financial arrangement for a microfinance model in Indonesia

Because of the diversity of the provinces in the Archipelago, Indonesia has implemented a decentralization policy since the Reformasi years. As a result, provinces and even more Kabupaten (regencies, or district) receive subsequent funds from the central government for managing their development.

Figure 2 - Microfinance model - Organizational arrangement



Following the recommendations of RENDEV, METI and YBUL have focused their efforts on setting up models at the provincial level.

Role of the players

- ✚ The **leading role** of the **Local Government** to provide the initial funds necessary for the ignition of the project and possibly allocate grants to the beneficiaries.
- ✚ The **monitoring role** of the provincial development bank, **BPD**, for managing the funds allocated to the financing of RE loans.
- ✚ The **central role of MFIs and BPRs** in the design and provision of specific loans. Moreover, the BPRs will be in charge of the collection of the monthly repayment and thus the keystone of the project.
- ✚ The **development of a network of Solar centers**, which will ensure the installation and maintenance of the solar systems. To ensure their sustainability, solar centers will be encouraged to diversify in the provision of other services.
- ✚ The **support of national solar energy practitioners**. They will develop the Solar centers, including the complete building of their team and ensure the monitoring. To ensure their long term implication in the program, they will sign contracts with the Kabupaten.
- ✚ The necessary support of development organization. The Indonesian partners of Rendev, **YBUL and METI** are pushing for the implementation of the project and will be willing to set up the framework and provide the necessary trainings. **PlaNet Finance** is willing to share its experience and lead the development of the necessary financial products.

Key factors of success:

- ✚ **Capacity of the MFIs** and their will to promote the project.
- ✚ **Quality of the contract** between the MFI and the solar providers to ensure that the solar centers will do their duty in a quality and timely manner.
- ✚ **Capacity** of the project to achieve economy of scales

Threat:

In this case, the client will deal with two main entities: the BPR, microfinance institution and the SHS service center.

RENDEV has stressed the threats of such an arrangement where the interest of the different parties might diverge. Consequently RENDEV will recommend the parallel test of a leasing model as described below.

4.1.4 Organizational and financial arrangement for a leasing model in Indonesia

RENDEV recommends the same partnership arrangement and the involvement of the same actors.

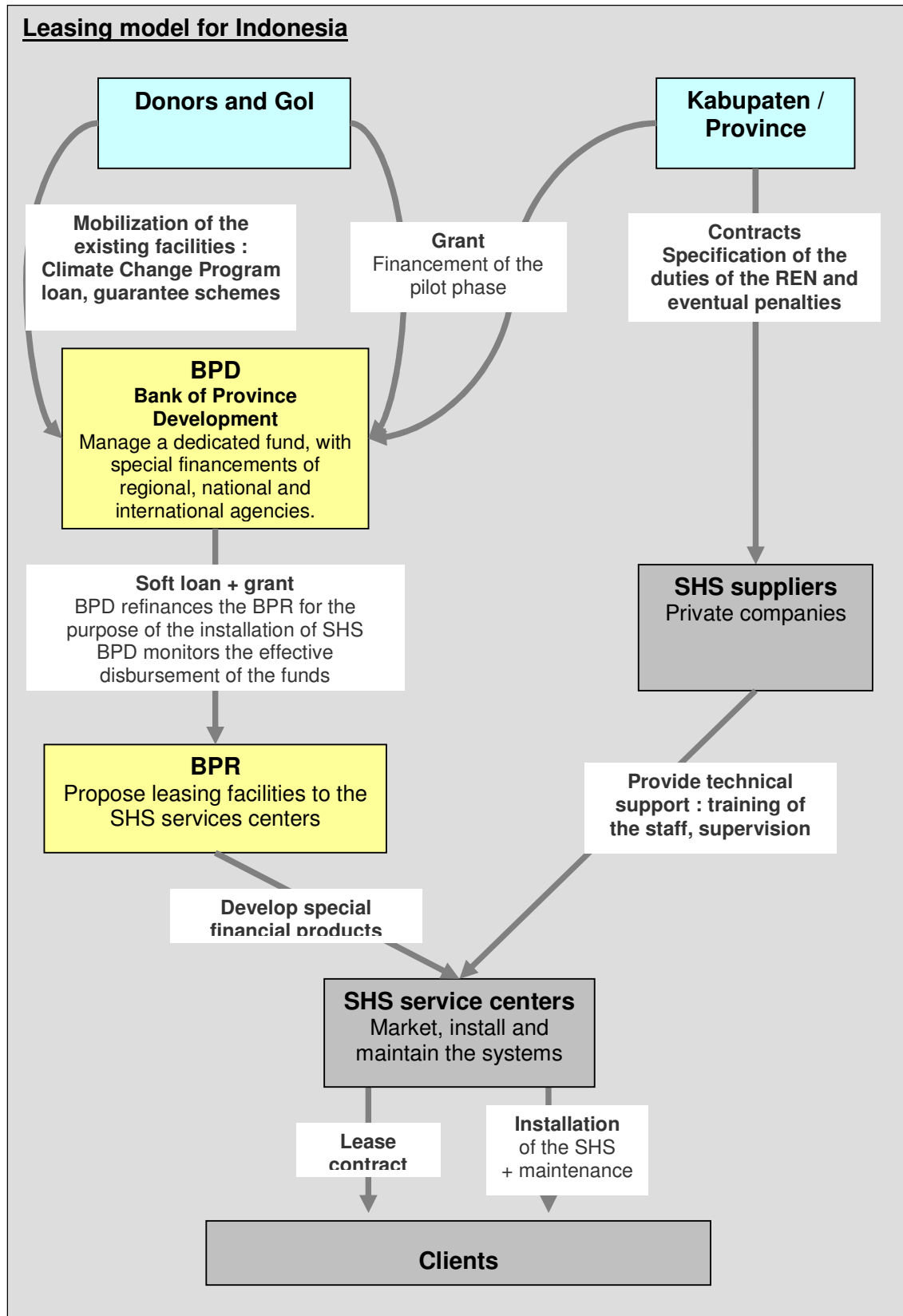
Role of the players

- ✚ The **leading role** of the **Local Government** to provide the initial funds necessary for the ignition of the project and possibly allocate grants to the beneficiaries.
- ✚ The **monitoring role** of the provincial development bank, **BPD**, for managing the funds allocated to the financing of RE loans.
- ✚ The possibility for BPD to design leasing products for the Solar companies
- ✚ The alternative possibility of BPR to design the products, or more likely to propose the products designed at the BPD level to the solar centers.
- ✚ The **development of a network of Solar centers**, which will ensure the provision of dedicated loans and its connection on top of the installation and maintenance of the solar systems. To ensure their sustainability, solar centers will be encouraged to diversify in the provision of other services.
- ✚ The **support of national solar energy practitioners**. They will develop the Solar centers, including the complete building of their team and ensure the monitoring. To ensure their long term implication in the program, they will sign contracts with the Kabupaten.
- ✚ The similar necessary support of development organization. **PlaNet Finance recommends the parallel application of both models**. During the sharing of experience workshop with the Bangladeshi partners, Bangladeshis have expressed their preference for a leasing model.

Key factors of success:

- ✚ **Quality of the leasing product**
- ✚ **Capacity** of the project to achieve economy of scales

Figure 3 - Leasing model - Organizational arrangement



4.2 SCENARIO 2: Improve the Indonesian pay-for-service model

One of the biggest limits of the **IDCOL model** is that the systems provided are individual, thus **the possible productive** use of energy are limited to an extension working hours thanks to availability of light and to mobile phone charging. Despite those large breakthroughs in the context of rural areas, **these systems are not big enough to power productive uses** of electricity. Indeed, **only those productive uses allow massive productivity gains**, which in return enhance extensively the competitiveness of products and services produced in the remote areas. For example a carpenter using electric tools such as hand-sander can produce as much as ten times more than the one that is not.

Minigrids are a perfect solution to the context of remote Indonesia, where villages are sparsely, access to them very difficult, and consequently cost of grid extension prohibitive.

4.2.1 Minigrid systems and productive usages

As a matter of fact, many Indonesians are already using very small-scale minigrids, running a diesel generator for a few hours and sharing the electricity between a few of them.

In order to foster the propagation of minigrids in Indonesia, **RENDEV thus suggests that a pay-for-service model be privileged**, whereby minigrid is installed in a community by an investor, and regular fees are collected from end-users. In this scheme, target beneficiaries do not become owners of the equipment, but pay regular fees for accessing electricity as a service.

RENDEV will recommend the **implementation of minigrids** using the **REN source available locally**, which can be **biomass, water, wind, solar** or a **combination** of several. In order to decrease the investment cost, and to increase the potential of the minigrid during the peak hours, RENDEV will promote the so-called **hybrid systems, which combine one REN source and traditional diesel engine**. The table 4 below highlights the benefit of hybrid systems. The diesel engine **should be chosen** to be able to switch to a **locally produced biofuel** in the coming years, so that the minigrid become fully REN powered.

4.2.2 Key elements for successful pay-for-service schemes

There have been previous experiences in Indonesia of PV hybrid minigrid installation under pay-for-service schemes. These experiences were implemented as pilot, demonstration projects, at a community level, for example within the Decentralized Rural Electrification project held under the E7 Initiative (cf *D3 – Overview of policies, Indonesia*).

These experiences can bring precious information on the key elements for the success of a pay-for-service scheme.

Ownership of the system

- **Involvement of the community:**

The community should have stake in the ownership of the system to ensure that its members will take a great care of it. The ownership will ensure an easier repayment, the dedication of the local employees of the mini-utility and foster good electrical practices among the population such as energy efficiency practices. To do so, the preparation phase, explained below would be a key-phase of the program.

- **Community ownership is a difficult process and hardly sustainable**

Common ownership under the form of a cooperative or any formal body like a municipal utility **set up for the purpose** of providing energy have a mitigated record. Governance might be unclear, and after a few years, different views on the management of the unit might occur. The whole system might be at stake as soon as a large part of the community feel apart of the new governance. Moreover, since the project might be granted, temptation for malpractices should be high.

Best practices are recorded when the implementer is an **operating cooperative** which has an ongoing successful business and which is trusted by its members, such as agricultural or fishery cooperatives. Such arrangements can be even more successful since the cooperative might be one, if not the most, consumer of electricity for productive uses: milling, drying, conserving...

- **Implication of a private entrepreneur**

The **involvement** of one or several **entrepreneurs**, operating the mini-utility for profit is the best asset for its sustainability, since the entrepreneur will make a return only if **the utility is well managed, the clients satisfied** and the **system running** long after the **return on investment**, which in the case of an energy project should exceed 5 years.

Financial arrangement

- Installation of the minigrid can be funded by the government with the support of donors. A **public-private partnership** can be set up with a REN supplier or a private investor. This partnership should define the respective responsibilities of the stakeholders regarding the installation, operation and maintenance of the system.
- One model that RENDEV would recommend is that the owner (s) of the system **invest 20-30% of the initial cost**, **access** to a **soft loan** with a **maturity long** enough to amortize the REN system (around 10 years) for the remaining 70-80 % of the initial cost, and that a **grant** covers the cost related to the **preparation** work with the community and subsidize a part of the first months of operations.
- Accordingly a **financial mechanism** should be **designed** at the **national level**, which will involve the **BPDs**, the newly formed Infrastructure Development Bank. Commercial and National Banks might be part of a scheme where the Development Bank act as wholesaler while Commercial Banks implement the deals.
- In any case, existing Indonesian **guaranty mechanisms** should be leveraged in order to mitigate the risks for a private investor.

Preparation phase and involvement of the community

- Remote villages in Indonesia in general are suitable for this model. Still, in order for the scheme to be implemented in various sites, research on 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.
- Open and responsive communication is necessary to ensure a high level of acceptance of the scheme by the users and a commitment and ability of the communities to manage and maintain the systems.

- The **role of the traditional social organisation** is very important to take up in the process, most specifically in the preparation stage.
- The **payment terms** (level of fees, payment schedule) should be decided with the consensus of the community **depending on the ability-to-pay of the end-users** (e.g. monthly payments, fee collection during the harvest period).

Operation and maintenance

- **Village units** (after evaluation of the human resources available in the villages) can be established at the local level by the entrepreneur. These units can be **responsible for the electrification scheme** and become the focal point of all project interventions within the communities.
- **Village units will be in charge** of assessing the potential for customers, manage the PV hybrid system and ensure that the collection.
- **Management teams** should include **members of the community** who will receive dedicated and extensive trainings.
- The **collected fees** are meant to be used for the **maintenance** and to cover the **operating** costs of the village electricity management units.
- Technologies could help the mini-utility to collect easily while proposing sound and easy ways to the households to manage their electricity consumptions. With **prepaid meters**, the consumers would pay its electricity bill at a neighbouring shop just as he does buy its phone loads. Thus, he will receive a certain amount of electricity (Wh) that he will use as of its needs.
- An **installation fee / connection fee** can be asked to households willing to be connected to the system. Its amount will mostly be symbolic (e.g. IDR 25,000) and will not cover the installation cost, but such a fee will be both a signal of the commitment of the community and an incentive for the users to take care and maintain the system.

Develop the demand

With electricity come several opportunities for productive gains and entrepreneurship. By taking these opportunities, community members will raise their revenues and thus have the ability to pay for their electric bill.

This virtuous circle should be promoted through:

- The **mobilization** of financial services providers to offer dedicated loans to the entrepreneurs.
- **Business Development Services (BDS)** programs to support the entrepreneurs in that shift.

Replication and scaling up

- While assessing the willingness to pay of rural populations, one should forget the cost per kWh that might be a lot higher than the one of PLN and **focus** on the **opportunity** for the populations to enjoy electricity and develop energy efficient behaviours. As promoted by the World Bank in the “Listrik untuk semua” report, the fee charged for minigrids should represent, in some extent, their costs. Thus, **their economic viability** should be **demonstrated**.

- REN costs are decreasing: Solar PV market prices have decreased by more than 20% last year, excedential capacity for windmills will result in lower prices. **Minigrid systems** will be **bankable** if **tariffs** are set **properly**.
- RENDEV believes that **successful businesses models** should be developed in Indonesia and reproduced by operators that might venture into franchise models. As soon as the key-numbers and key-factors are highlighted, local entrepreneurs will catch interest into entering in a business that offers a reasonable profit while benefiting to the communities.
- The **potential of implying local businessmen** or successful businessmen living in the cities while having their roots in giving areas is often underestimated when drafting social policies under which access to energy falls. RENDEV recommend their larger involvement in order to benefit of their capacity to manage and operate a company, and their important investment capacity.
- **RENDEV recommends the pilot testing of different business models.**

Next steps for Indonesia:

So far, individual models seem to have the favour of the implementers. Decentralized generation of electricity is not seen yet as a possible social business in Indonesia

Annex : Roadmap for implementation in Indonesia

Phase 1 : Pilot testing

- **Step 1: develop a pilot framework**

1. Develop a proposal

METI will take the lead in preparing a proposed business model that will include the Microfinance Institutions.

2. Propose the framework to policy makers

Several Bupati and other policy makers have expressed their interest. METI will present to them the proposal for financment.

Discussions will be started with the identified wholesale funders : BKPs.

3. Conduct a feasibility study

A feasibility study will be conducted which will dress:

- the capacity to pay of the future beneficiaries
 - ➔ Determination of the size of the future market
- the challenges in operating solar companies
 - ➔ Determination of the future cost of operations
- the capacities of the future financial intermediaries
 - ➔ Determination of their role and the technical assistance required in the design of the products

4. Develop a business model for:

- The solar operators
- The local entrepreneurs
- The microfinance institutions/ BPR/ Cooperatives

5. Develop a financial, operational and legal arrangement

- The financial arrangement will dress the modalities of transfer of the funds from the wholesaler to the operating institutions (Solar operators, MFIs)
- The operational arrangement will state the different duties of all the parties
- The legal arrangement will determine the obligations of al the parties and specify the enforcement modalities.

6. Build up the capacities of the actors

- Training of the future solar installers/entrepreneurs
- Technical assistance to the MFI for the design of the new product
- Technical assistance to the BPD for the monitoring of the wholesale scheme
- Technical assistance to the Kabupaten teams for the monitoring of the scheme

- **Step 2:Implementation of the pilot**

7. Start of the operations
 8. Awareness raising activities
 9. Mid year review
- **Step 3: Reinforcement of the framework for replication at the provincial level**
 10. Review of the first year of operations
 - Dressing of the lessons learned with all the actors
 - Conduct comprehensive needs assessment of the players after one year of operation

Phase 2 : Enhancement of the model and replication

- **Step 1: Redefinition of the framework**
 - Implementation of a provincial policy subsidy
 - Conclusion of financial, operational and legal arrangements between the players
- **Step 2: Technical assistance and trainings**
 - Enhancement of the training materials and technical assistance curriculum
 - Delivery of complementary trainings to the actors
- **Step 3: Operations**
- **Step 4 : Monitoring and evaluation**

Phase 3: Expansion at the national level

- **Step 1 : dressing of the combined lessons learned and selection of the best model**
- **Step 2: Development of national policies**
- **Step 3: Development of a national framework**
and especially appointment of one national body in charge of the monitoring, definition of the modalities (financial, operational, legal arrangements)
- **Step 4: Expansion of the implementation**

