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An Integrated Microfinancing Concept for Rural Electrification by Photovoltaics in Developing Countries

Rana Adib
Frank Gagelmann
Knut Koschatzky
Klaus Preiser
Günter Hans Walter

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Contact:

Fraunhofer Institute for Systems
and Innovation Research (ISI)
Department "Innovation Services
and Regional Development"
Breslauer Strasse 48
D-76139 Karlsruhe
Telephone: +49 / 721 / 6809-138
Telefax: +49 / 721 / 6809-176
e-mail: cs@isi.fhg.de
URL: www.isi.fhg.de/ir/departm.htm

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1 Introduction

About two billion people in the southern developing countries live without access to grid-based electricity. According to the World Bank, this amount even increases as population growth rate rises faster than electrification ratio. For the households concerned grid extension is frequently not an option – the average consumption load is too low to justify the high costs of infrastructure. Decentralised stand-alone systems powered by diesel generators, hydro power, wind or photovoltaics (PV) are a viable alternative to grid extension. Cost calculations show that very often PV systems are ideally suited for decentralised rural electrification as they make people in remote areas independent of fuel deliveries and prices, they are best exploited on a small scale, and they are highly reliable.

During the last decades, high investments have been realised by governments and international institutions. PV technology has achieved a considerable standard and Solar Home Systems (SHS) have proven in various pilot and demonstration projects to be a feasible solution regarding technical and social aspects to electrify disperse households. Consequently, important markets have started to grow. At this, commercial players of solar industry and finance, manufacturers of components, electric utilities, banks, venture capitalists etc., start entering the markets. As a result, economic requirements change: all costs have to be covered, financial flows must be designed in a sustainable way, rural electrification business with PV must generate profits.

So far, many of these players do not know how to enter these new rural electrification markets in a sustainable way, especially how to reach the potential customers, with rural households mostly requiring adapted financing services as a consequence of their low and unsteady income. Financing schemes realised in past projects could often not ensure a continuous and sustainable financial flow at the customer level, which is essential for a sustainable and profitable dissemination of SHS.

The 'Gemeinsame Studie' of the Fraunhofer Institute for Solar Energy Systems (Fraunhofer ISE) and the Fraunhofer Institute for Systems and Innovation Research (Fraunhofer ISI) aimed at developing such appropriate financing concepts in order to support the German industry in entering the rural electrification market and meet the requirements of the target customers. The "integrated microfinance concept" which was developed is based on the idea to consider the concept of microfinance (MF) and involve microfinance institutions (MFI) in the dissemination of SHS. Therefore, traditional MFI, their methodologies, their customers etc. have been studied to draw conclusions for rural electrification projects. Additionally, approaches derived from successful experiences in Europe in the financing of new technology-based firms (NTBF), and the save-up financing used in building societies, have been reviewed. The "integrated mi-

crofinance concept" merges the results of these areas against the background of traditional financing models used in the course of rural electrification with PV like hire purchase, leasing, fee-for-service etc., as well as against the types of investors, and types of MFI. The idea of the "integrated microfinance concept" is that the appropriate rough financing model can be identified and then be adapted to the specific conditions like institutions involved, customers, societal context etc.

The research is based on different sources of information. First, intensive review of literature on rural electrification with PV, microfinance, financing of NTBFs, and save-up financing have been undertaken. In a next step, on-site investigations of the MF sector have been realised in Morocco, Bolivia, Brazil and Egypt. These countries were chosen because of existing conditions in the MF sector: in Morocco, primary experiences with the linking on PV and MF exist; Bolivia's strong MF sector - rather being an MF "industry" - allows to view various types of MFI realising different approaches and technologies. Brazil and Egypt are very much engaged in investing in PV. For the characterisation of potential investors in the market of rural electrification with PV, investors have been categorised and interviews with investors have been realised.

2 Rural Electrification with Photovoltaics

Rural electrification activities are in general realised in the course of national infrastructure programmes, comprising the extension of the electric grid on the one hand, and decentralised electrification of remote villages and households on the other hand. Decentralised electrification of rural households can basically be realised in two different ways – the individual electrification of each household or the building of a decentralised minigrid. PV plays an important role in each of these approaches, while the technology standard and the level of experiences as well as the quality level of the energy service offered, i.e. possibilities for use of high energy consumption loads, varies.

Individual Household Electrification: Battery Charging Station and Solar Home Systems

A Battery Charging Station consists of a central station with several PV modules and charge regulators. The customers can carry their car battery, connect it to the battery charging station to charge it. Typically, they pay a charging fee to the operator. Subsequently, they carry the battery home in a more or less appropriate way and discharge

the battery in order to get electricity for light, radio, and a TV set. Obviously, carrying the battery implies high inconvenience.

The operator of a battery charging station is often a micro-enterprise, responsible for the charging of the batteries, operation and maintenance of the charging station. The income of the micro-business is based on the charging fees paid by the customers.

Solar Home Systems are small stand-alone systems consisting of a module, a charge regulator, and a battery to bridge the nights and bad-weather periods of typically up to three days. A SHS provides direct electricity to run fluorescent lamps, a radio, and a black and white TV set. The usual $50W_p$-SHS are normally designed for a single household.

As the average annual income of the households concerned, i.e. the potential target customers, is low in comparison to the investment costs of US$ 500-1,500, payment schemes on an instalment base have to be offered. Typical schemes like hire-purchase, leasing, and recently also fee-for-service have been implemented (see section 2.3). As the customers are very disperse, the collection of the payments represents a crucial point: intermediaries are often not appropriate, operational costs are high, customers' income is low and underlies serious risks.

Village Power Supply

Minigrids for village power supply are often based on hybrid systems, which consist of an energy storage unit and different electric generators like PV, wind, diesel, and hydro. In the past, such hybrid systems were mainly used to provide alternating current to remote single houses for example in the Alps. Currently, in the course of national rural electrification programmes for example in Morocco, Indonesia, Argentina, or Mexico, the technology of hybrid systems is often considered for remote villages with a low dispersion of the households. At the moment, hybrid systems for village power supply are only realised in the course of pilot- and demonstration projects, as, apart from technical questions, serious social questions due to the common use of a restricted resource have to be examined.

In contrast to SHS pilot- and demonstration projects, such village power supply projects often already focus, next to technical and social aspects, on economic criteria and are implemented in a commercial framework. The general approach used in this context is the involvement of an operator of the system, who is also responsible for non-technical aspects such as tariff structures or the collection business and acts like a local, respectively regional, electric utility.

Commercial Rural Electrification Market with Photovoltaics

Past rural electrification programmes were often economically not viable, as the financial flow broke down and investment and running costs could not be covered continuously. To enable sustainable electrification of rural areas, the design of electrification programmes changed from pure aid programmes, to infrastructure programmes which involve the private industry and focus on market initiation. This represents an interesting opportunity for the industry to enter the rural electrification market. National and various international players from industry and finance already started their activities in this field.

At the moment, the commercial rural electrification market with PV is mainly based on individual household electrification with SHS as many experiences exist here, various market schemes have been designed and already realised, and a considerable technical and commercial level could already be achieved. Being the most relevant market for the customers of the Fraunhofer Institutes in the context of this study, the investigation focuses on the dissemination of SHS.

The customers of the commercial actors in this market are individual rural households with a low income – the average annual per capita income in the developing world is of 1,250 US$ and even lower in rural areas. As the income of the target customers is mainly based on agriculture activities and partly to a small degree on transfer payment of family members in the cities or abroad, there is in addition a high risk of loss of income depending on the harvest. Thus, only around 3% of the potential customers could afford to buy a SHS on a cash base. As the target households do neither have access to formal credit (this will be described in chapter 3), financing schemes allowing payment by instalment must be offered, most commonly hire-purchase or leasing, and fee-for-service:

Figure 1: Hire-purchase Scheme[1]

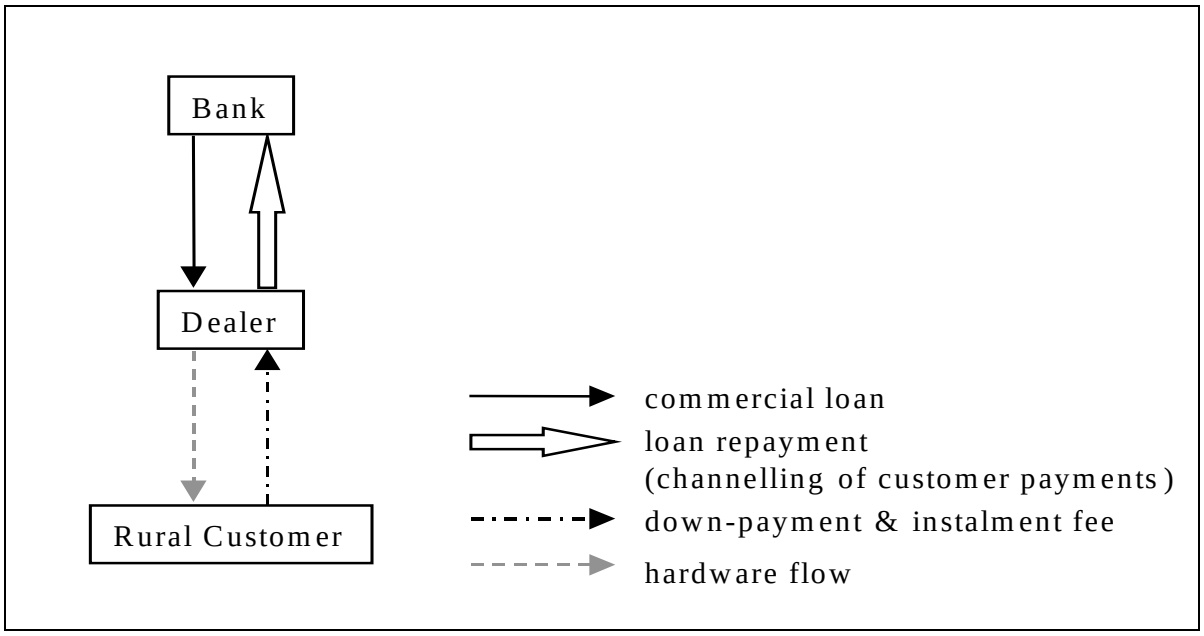
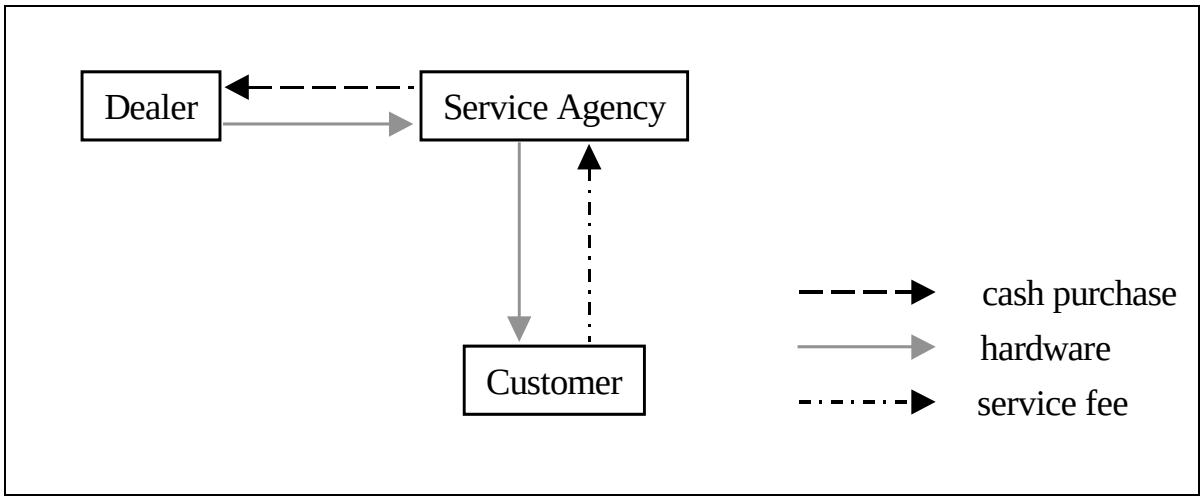


Figure 2: Fee-for-service Scheme



The significant difference between hire-purchase/Leasing and fee-for-service is made up by the terms of the contract, the propriety of the SHS, the duration of the technical service, and the amount of the payments. Yet, independent of the detailed market concept, the same players can be identified, as well as a technical (installation, operation and maintenance), social (user training), and financial flow (pre-financing, repayment).

1 Leasing scheme is similar regarding the flows, but duration of operation and maintenance service and propriety is different to hire-purchase.

The decision about the market approach does not only depend on the legal framework or the shape of the national electrification programme, but also on the individual approach of the PV intermediary involved, his financial capacity, infrastructure for distribution, technical service, and fee-collection, and co-operation with other local players.

For a PV company, offering such financial service to its clients means facing new needs, challenges, and also risks:

- infrastructure for collection business must be established,
- pre-financing of the hardware is necessary,
- payment of the instalment fee by the customers must be assured.

Also the channelling of the instalment payments from the users in the rural areas to the selling company must be assured.

3 Microfinance for Rural Electrification with Solar Home Systems

The 'poor' in the developing world have in general no access to financial services (loan or deposit) of 'conventional' banks. Reasons for this are the lack of material collateral as well as of a credit history/credit records on the customer's side, and comparatively high operational costs for the banks.

This situation is even deteriorated in rural areas, as population is disperse, income is based on agriculture which is linked to higher income risks depending on the harvest, etc. As a consequence, a rural formal conventional banking sector is extremely underdeveloped or does not even exist. This is also the reason for the fact that PV companies must offer financial services to the customers targeted in the rural electrification market.

3.1 Microfinance

MF is basically the provision of financial services to the client segment not served by conventional financial institutions, like commercial banks, for reasons mentioned before. Two major movements can be identified, which lead to the development of MF:

A root-based, rather bottom-up movement, originates in the fact that the population, which does not have access to financial services, nevertheless does have a strong need for them. For this reason, these people commit themselves to a kind of association like 'Rotating Saving and Credit Associations' (ROSCAs) or even to credit co-operatives, to save and enable one another to access credit. Obviously, credits disbursed in this context focus on the principal needs of the members.

A top-down movement exists in the context of development policy, where MF is a common instrument for poverty alleviation. The idea is to provide on the one hand the possibility to save - to enable safeguarding for difficult circumstances or bigger investments - and on the other hand to offer credit for income-generating activities, like the purchase of a loom, to build up or enlarge a microenterprise. Providers are typically NGOs and savings banks, partly also commercial banks.

To overcome the above mentioned problems regarding the credit disbursement to the "poor", the MFI have developed an innovative lending procedure based on the principle of "credit worthiness" rather than on "security for credit". The mechanisms are generally based on the creation of social collateral in form of different modes of acknowledged social commitment, like lending to a peer-group or self-organisation within a village bank. Also, there is often a focus on female customers as their sense of social obligation is generally stronger than of male customers, which results in a better repayment and often a use of credit for the improvement of the family's economic and social situation.

In addition to such social mechanisms, repayment incentives are established by offering progressive credit sizes, which means that a customer with good repayment of an initial smaller credit qualifies for a further credit of a higher volume.

Furthermore, the MFI also realise an in-depth analysis of the customer's economic situation and, when existing, his microenterprise, to know the sources and time of income, existing risks of loss of income, and ways chosen to balance these risks. This enables the MFI to limit the non-payment risk and adapt the repayment and income cycle.

The realisation of the MF technologies have proven in many countries to be a great success, showing that the 'poor' do not only have savings capacity, but are also solvent; the outcome is an outstanding expertise of MFI demonstrated by repayment ratios of up to 99%, which is much higher than achieved by commercial banks.

In addition to this, MFI have shown that it is possible to cover the operational costs with the comparatively low profit achieved with small loans – an outcome of the expendable evaluation process, continuous follow-up of the customers, and reduced

risks. Even profit can be achieved, which is the reason for growing activities of commercial institutions, and lead to the development of various types of MFI, MF products and of the MF 'individual lending' technology.

3.2 Microfinance Institutions

As mentioned before, different types of MFI exist, depending on the roots of the MF movement as well as on the status of the MF area, but also on the existing legal framework and regulation.

Apart of these more historical features, a key characteristic is the formal status of an MFI, i.e., whether the institution is under the 'superintendence of banks'. This is especially important as only formal financial institutions, also only formal MFI, are allowed to handle savings. As these are, next to external funding, the most important refinancing source of MFI, informal MFI are not only restricted regarding the MF products they can offer, but must also search for alternative funds and concepts for refinancing. Traditionally, only banks and savings banks are formal financial institutions. Yet, countries with a strong and growing MF sector like Bolivia show a tendency to allow rather informal MFI as well as credit co-operatives to get formalised.

Another criterion is the target group of the MFI. Especially in countries with various MFI applying different lending technologies and MF products, there is a tendency to have the target group linked to the lending technology:

In comparison to group loans, individual loans are generally larger because – even if collateral requirements are minimal – individual loans are often linked to some collateral. For this reason, the groups targeted do in general have a steady reasonable income, former credit records (often in the course of former group loans), or basic material collateral.

In contrast to this, group loans are smaller and often linked to the productive use, as the customers targeted have a fundamental need for improvement of their income situation and must therefor make a social commitment to access credit.

This observation, however, has to verified from case to case, as the culture has a strong impact on the structure of the target groups.

3.3 Microfinance and Rural Electrification

As mentioned before, in rural areas MFI have to face conditions which even increase the problems for the credit business, such as

- high distances to the clients
- high dispersion of the clients
- income based on agriculture, which leads to higher income risks depending on the harvest
- longer or even irregular income cycles; i.e. terms of the credit must be longer

In general, these conditions imply higher operational cost – the reason for little presence of formal MFI in rural areas. In regions where MFI serve rural clients, interest rates are in most cases increased, as the higher operational costs are in general transferred to the clients.

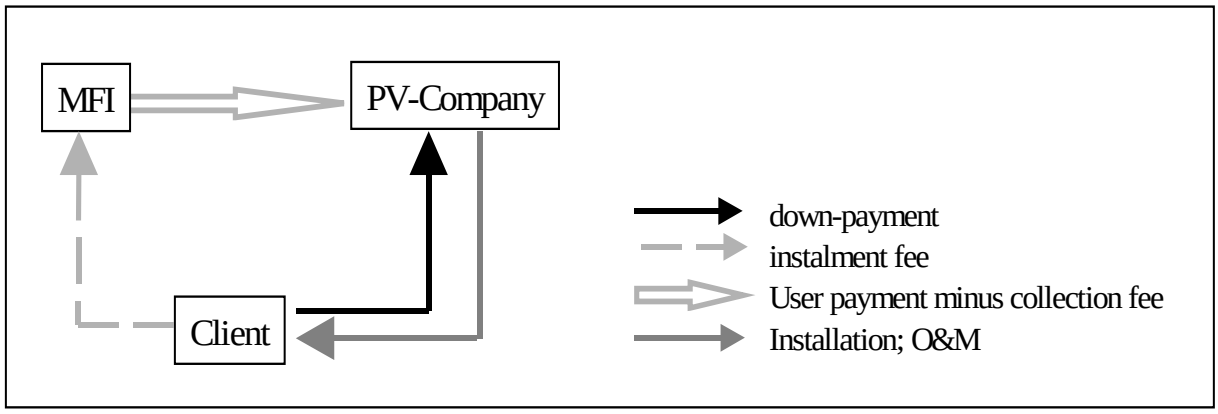
Generally, two basic approaches can be chosen to link MF and rural electrification with PV: engage an MFI as an intermediary in the dissemination of the PV systems or implicate the MF technology and mechanism in the dissemination by know-how transfer to an existing (non-MFI) intermediary. In the following, we will focus on the involvement of MFI, as they have developed and realised concepts, and established their institution focusing on aspects which present major problems in the commercial rural electrification market. The involvement of an MFI can be very fruitful in different fields of activities:

- **Collection Business**

With the outstanding expertise of MFI in assuring the repayment of credits, their main role in the course of rural electrification is the organisation and assurance of the collection business, i.e. of the SHS user payments. This will also lower the problems regarding the fund transfer from the user 'in the village' to the PV company 'in town', as MFI are always connected to the financial sector in one or another way.

Figure 3 illustrates a possible design of such an MFI involvement. The MFI is responsible for the collection of all periodical instalment fees. An initial, one-time "downpayment" could be paid directly by the client to the PV-Company when the SHS system is delivered and installed. Operation and maintenance (O&M) is done - or arranged - by the PV-Company.

Figure 3: Organisation of the collection business by an MFI in a commercial approach



The division of the technical and the financial flow shown in figure 3 can obviously also be realised in the course of electrification programmes, for example within a revolving fund[2].

- **Pre-Financing of the Hardware**

In the course of purely commercial approaches to the dissemination of SHS, especially formal MFI can play an important role in pre-financing the solar systems, which otherwise would represent a major obstacle for small PV companies in the developing countries. This type of co-operation is generally also possible with informal MFI, but in this case the pre-condition for a large-scale project is often the existence of a special external fund for the purpose of rural electrification.

- **Market Information and Social Approach**

For the provision of market information, the involvement of an MFI can also be an advantage, in particular for information about the economic situation of potential and future clients. These are very helpful for market research and for the identification of reliable, "safe" customers.

Additionally, to promote the clients' acceptance of the PV company, the rural electrification project, or the payment modalities, it can be helpful to collaborate with a well-established MFI, which already went through the process of social adaptation and could increase the readiness to pay of its clients.

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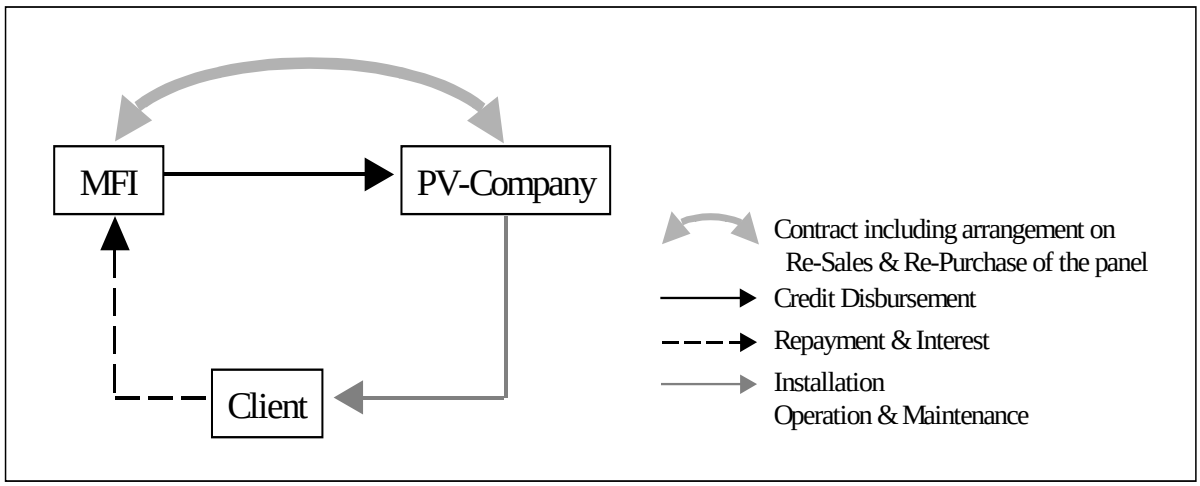
2 This would mean a fund which hands out loans and then uses the instalment payments it receives on these loans for the extension of further credits.

'Rural Electricity Loans' - A Strategic Alliance between PV and MF

The various collaboration possibilities between a PV company and an MFI in a commercial market should be united in the form of a strategic business relation:

Figure 4: Concept of "Rural Electricity Loans"



Basically, there is a division between the technical and the financial flow: The PV company is responsible for the technical flow, meaning installation of the SHS, operation and maintenance, and training of the users. In the form of a "Rural Electricity Loan", the MFI would be responsible for the pre-financing of the hardware as well as for the organisation of the whole disbursement and collection business.

The contract between the partners comprises an arrangement on re-sales and re-purchase of the solar panel, in order to facilitate the use of the hardware as collateral in case of non-payment by the client.

To avoid the risk that the MF client uses the credit for another purpose than for the purchase of an SHS, the credit will directly be disbursed to the PV company. A retention rate will be included to assure the presence of the PV company and realisation of the technical service during the whole credit period.

For the sustainability of this concept, both partners have to ensure a high quality in their field: The PV company must ensure the functioning of the SHS, as this is the precondition for ongoing payment of the users or the MFI clients. Thus, the PV company must realise an excellent electrification concept with regard to all relevant technical, organisational, and social aspects. The MFI, on the other hand, must offer an excellent financial service in order to ensure the continuous payment by the users. The MFI has to realise a consequent follow-up by the clients, however using socially viable collec-

tion methods, as excessive pressure to achieve high repayment affects the image of the PV company.

For the success of the concept, it is furthermore necessary to identify general correspondences and differences of the market approaches of the partners; slight differences can be overcome by adaptation of the approaches. Main aspects to consider are the lending and collection technology used, the target group, and the interest rate.

The survey realised by the Fraunhofer Institutes has shown that the organisation of the MFI clients in a special way, for example in peer-groups, plays an important role for the process of repayment and might be crucial for the achievement of a high repayment ratio. As a consequence a similar, corresponding organisation of the SHS users should be considered.

It is evident that the similarity of the target groups of the partners is supportive for example regarding information and access to potential clients, but a difference is not necessarily a dilemma. In such a case the appropriateness of the MF approach and the lending technology to the solar target group must be verified.

Looking at the interest rates, these must meet the conditions of the rural electrification market, as high interest rates signify offering rural electric service not only at high costs compared to the electric grid, but also at high financial costs. As it is for example the case in Bolivia, this is often not accepted by PV customers. However, especially for the interest rate, there is a possibility of adaptation, as "Rural Electricity Loans" offer for the MFI the possibility to lower the risks and operational cost. This is because material collateral in the form of the solar panel exists, realisation of bulk PV projects in a region enables the reduction of operational costs, and "Rural Electricity Loans" as 'high-cost, low-risk' credits offer the chance to balance the portfolio of an MFI.

4 Investors in the Rural Electrification Market

Considering figure 4 as a basic scheme for rural electrification projects based on the integration of MFI, there are generally two fundamental ways for investment: in the 'technical' or in the 'financial' intermediaries. Both can be realised in different forms: direct investments in the form of equity and shares, indirect investments to enable the intermediary to re-finance on the national and international capital markets, and non-capital investments like giving technical assistance.

Various national and international investors and potential investors out of industry and finance exist. In the course of the study, the Fraunhofer Institutes have realised exemplary interviews with some investors.

Generally, the investors can be split up in one group which is not yet active in the area of rural electrification and does not have detailed information on the market, and another group which plans or has already started future involvement.

The first group does obviously need further information on the rural electrification market, players, perspectives etc. Economic expectations of their actual investment often differ very much in terms of what seems realistic in the area of rural electrification. Not only the 'new' PV technology, but also investing in players or activities in the developing countries frequently represents a barrier. To overcome it, further information, consulting for new investments, and networking should be realised.

The motivation of (future) PV investors is for the moment mainly linked to idealistic and image aspects on the one hand, and preparation of strategic fields on the other hand. All investors contacted know that return on investment in rural electrification cannot be expected in a short term period. For this reason, the image aspect of an investment in rural electrification with PV – development aid and environmental protection – is for the first phase of a couple of years essential for the investment decision and justification.

Type and extent of investment, the commitment of the investor in general, depend very much on the strategic signification of the investment: the French electric utility EDF and the Dutch utility NUON commit themselves very much in rural electrification in Mali by establishing an intense infrastructure for electrification of the rural households, because they consider the rural electrification market in the developing world to be of high future importance.

In this chapter, the (potential) investors and their main motivation for entering the rural electrification market are described, based on observation during discussion, projects, and co-operation previous to the 'Gemeinsame Studie' as well as conclusions out of the interviews.

Component Producers

Obviously, manufacturers of the main SHS components are among the main players in the rural electrification market, following the objective to sell their goods with profit. For these producers there are basically two possibilities to sell their products: selling to the PV dealer on a traditional supplier base or getting involved in selling the SHS or

the electric service to the end-user. This is obviously linked to a different engagement of the manufacturer.

Since for producers of batteries and lamps the rural electrification market is only one of their markets, they generally sell their products on a traditional supplier base. The situation is different for producers of the special solar components like the solar panel and the charge regulator: as the rural electrification market is their natural market, they are often ready to enter stronger commitments to establish a good distribution structure and concepts to reach the SHS users, which is obviously linked to investments – in the form of capital, technical assistance, training etc.

A further central criterion of a component producer is whether he is a local or international player. International players often have the possibility to use a well-established international distribution network and supply their products directly without needing the infrastructure in the target country.

Electric Utilities

Electric utilities basically sell electric service to their customers. Even though this service is traditionally grid-based, conventional electric utilities play an important role in the rural electrification market with SHS, as the philosophy of selling electric service is based in the companies. Besides, electric utilities have a motivation to be recognised as a main player in the global electrification market – urban and rural, grid based or decentralised.

The national electric utilities in the developing countries are often involved in rural markets, being the operational agency in national electrification programmes. In this context, they generally do not act as an investor. Besides, in the course of the opening of the electricity market, which currently is often restricted to one national electric utility, some electric companies start the electrification of 'their' rural areas with PV. In this context the electric utilities also act as investor, e.g. for the pre-financing of the SHS; establishment of a logistic structure etc.

Also international electric utilities recognise the rural electrification market as an interesting strategic market, especially since the electrification market in many European countries becomes tougher in the course of liberalisation. Moreover, many of the international electric companies are involved in the area of telecommunication, which in the developing world is one of the most important markets of the future and also requires electricity supply.

In fact, the international electric utilities especially act as an investor, as the operative activity is mainly realised in co-operation with local partners, often local electric companies.

In accordance with the philosophy to offer electric service to the customer, it can be stated that electric utilities will generally invest in the rural electrification market to build up an infrastructure which allows to sell the electric service produced in the SHS on a fee-for-service base. For this reason, an investment partner will generally rather be a technical or service agent than a financial intermediary like an MFI.

Financial and Insurance Agencies

Rural electrification needs financing. In the course of national electrification programmes, mainly national, bilateral, and multilateral financial agreements are established by the development of financial agencies. With growing commercial approaches, financing is not any more restricted to special financial agencies. As commercial PV players have a strong need for financing, direct investment, guarantee funds, and insurance services play a crucial role in enabling them to access funding for re-financing, expansion of the activities, etc.

Consequently, financial and insurance agencies consider the growing (semi-) commercial rural electrification market as a chance for a new field of action, and are very important - often the decisive – investors in the markets of the future.

A problem existing with these financial agencies is the lack of know-how about the technology, necessities and risks associated with doing rural electrification, etc. (see also chapter 5), and inappropriate expectations regarding return on investment, time of return etc.

Some of these financial intermediaries, like the TRIODOS Bank, already started to specialise in the field of rural electrification with PV. For the 'normal' financial investors further information and support regarding investment decision is necessary.

The involvement of MFI in rural electrification certainly represents a new perspective for financial investors interested in this area, as it enables them to invest in an intermediary, which acts in their own field – the financing area.

Non Governmental Organisations

Next to many small Non-Governmental-Organisations (NGOs) acting in the field of rural electrification – often in the context of a highly subsidised electricity provision – there are larger NGOs frequently based in industrialised countries, which focus on the

support of intermediaries in developing countries. Since MF can be called a kind of a 'development fashion', such NGOs are very frequent in this area. Such NGOs could therefore enable an MFI to access refinancing sources.

Public Sector

National rural electrification programmes are always based on public support or public investments, be it in the developing or the industrialised countries. Motives are rural development in the course of the national development policy, environmental protection and dissemination of renewable energy technologies.

For the commercial rural electrification market public investors can play an important role if the design of the relevant 'governmental' programmes supports the commercial approach to, and the engagement of commercial players in, rural electrification.

5 Financing Experiences in Europe - Innovation Financing of New Technology-Based Firms and Building Societies' Saving Agreements

It could be shown that, in principle, MFI appear to be suitable for the financing of SHS. Specific questions remain open, however. As similarities can be found, experience gained in Germany in the financing of innovations and new technologies, and in the financing of large private investments (building of a house), can possibly be applied to financing SHS in developing countries.

For a potential SHS user, the purchase of the PV system is an investment in a new technology, associated with problems such as long-term time horizons in financing and high investment sums, in contrast to limited financing availability and low incomes. The innovation financing of new technology-based firms, and also individual parts of the 'save-up financing model' used in building societies with a savings and loan association (regular preliminary saving, building up a credit record, mobilising bank capital) are relevant here, because the problems of low income and lack of collateral among buyers and the high risks for the financiers that are linked with these aspects in Europe, pertain in this situation, too, albeit in a different societal context.

5.1 Innovation financing of New Technology Based Firms

The following chapter concentrates on this very special subject of innovation financing – mainly based on experiences in Germany – the financing of "New Technology-Based Firms" (NTBFs). These are defined as newly-founded or young companies whose core activity is the development and selling of innovative products, processes or services. From the perspective of investors, NTBFs show several differences compared to established small and medium sized enterprises, especially to those that are not active in the field of high technology.

Capital requirements: When NTBFs set up their first business activities, they often have to overcome a phase in which major expenditures accrue but revenues are low or non-existent. This is due to the need for R&D (in order to offer a product with high reliability) and other activities that are necessary before first sales can be made. For this phase, external financing is required because normally the founders of NTBFs cannot raise the whole amount on their own. Financing must also be available to finance later phases of NTBF development (e.g. for production lines, market penetration etc.). Therefore NTBF financing requires large amounts of money. Capital requirements of several million DEM are not unusual.

A way to handle this aspect is to split up the financial burden between more 'shoulders' – for instance by seeking a 'mix' of financing agents. Sources may include:

- the entrepreneurs' own financial resources. Thus founders of new technology-based firms usually need to co-operate with financing institutes to a very far extent to enlist their help in raising the necessary funds;
- public promotion programmes providing e.g. subsidies and equity capital or venture capital (VC), whose suppliers could be in close contact to the NTBF as their capital participates in the success and the risks of the NTBF. On the one hand it is provided by private, commercially oriented "VC funds" and by investment companies ("Beteiligungsgesellschaften"), some of them with political assignments. In Germany some investment companies such as the Mittelständische Beteiligungs-Gesellschaft Baden Württemberg use public programmes for their engagement in NTBFs;
- banks to provide "loan capital" (credits).

In future, also "Business Angels" may become important for financing: former business executives or entrepreneurs – with experience and money to invest – can engage in the foundation of a new enterprise. Besides providing capital they usually also offer business knowledge.

Capital investment periods: The development and market entry of innovative products, processes and services require capital to be tied up for a long period. Long-term fi-

nancing is essential for NTBFs. This requirement also may constitute a barrier to the acquisition of finance. In very new fields, it can take 7-8 years and longer before break-even is reached. Even later, when revenues start to accrue, financial constraints often remain. Further expenditures frequently have to be made for marketing purposes, to extend production, or for further R&D.

Special features of the financing of new and complex technologies: The elaboration of new technologies is associated with a high risk of technical and economic failure. Thus contributors of financial means have to base their decision on the future prospects of the enterprise. Assessing the new technology's potential and the new entrepreneur(s') business and organisational skills is difficult. Specialist knowledge in the technology field of the NTBF is necessary. In order to be able to act effectively in innovation financing, some VC funds have specialised in just a few technological fields. Some banks and investment companies co-operate with experts to have access to techno-economic expertise.

Income of NTBFs: Usually the income generated by the NTBF and its success are directly linked to the success of the innovation because at first this constitutes the only source of income. Up to the point where their product is established on the market, NTBFs only have a small amount of income to re-invest in the firm. Some NTBFs offer consultancy services or components of their final products to generate income.

Physical and personal collateral situation: Real physical collateral is lacking, or its value is low compared to the volume of financing required by NTBFs. Since most of the initial expenses in a technology-intensive enterprise are normally for "non-material assets", such as personnel costs for researchers and business specialists, and for working capital, the collateral situation of NTBFs in the early phases of their existence does not provide much scope for external financing. Therefore, personal collateral may be required in NTBF financing. But credit records ("track records") or balances of the NTBF do not - or hardly - exist. For this reason assessment of the founder or the founder teams as persons ("Gründerpersönlichkeit") are of great importance for supporting institutions. Deficits in physical and personal collateral have to be neutralised by a very good quality of the business plan, serving as the main indicator for the business capabilities of the entrepreneur(s).

High operational expenses for a financial intermediary: NTBFs usually have a great need for consulting since usually the technically-oriented founders have not yet accumulated a sufficient range of experiences to be able to handle the complex tasks involved in setting up an enterprise. Also screening and control costs are high, and the failure risks and resources expended on loan servicing and managerial backup are not necessarily compensated by prospects of higher income or increased value of the in-

vestment. The return on investment for investors especially in the early stages of NTBFs is much lower than for many alternative investments in the market.

Risks: NTBFs are associated with various risks: technological risks, if product development is not yet completed; market risks (which are associated with innovations in general); and other risks stemming from the fact that the firms are young, have not yet consolidated their organisational structure and are not yet established in the market.

5.2 Building societies: the save-up financing model

In principle, in a save-up model, a part of the financing sum must be saved by the customer of a financial institution before he can receive external financing. A common application of this model (whereby loan eligibility depends on prior regular savings) can be found in the building loans for houses, which are offered by "building societies" in several European countries.

A building society can be seen as a kind of solidarity association: savings deposits from customers respectively 'members' who are not yet receiving loans are handed out as current credits to other "members". The relatively low interest rates paid for the deposits also enable credit interest rates to be kept down. One major disadvantage of building loans is that expenses for the customer, e.g. rent payments, continue during the whole save-up period.[3]

Building loans are designed for houses or (freehold) flats – items which, in relation to the customers' income, mean very high expenses. One of the main focuses of building loans is to reduce the financing amount for both sides. Hence it does in fact reduce the amount, and thus reduces the associated risks for both partners. A typical building loan in Germany has a term of 12 years, compared to 20-35 years for a mortgage loan.

The income of the majority of house builders is limited, but normally fluctuations in the income of the users are not very high in Germany. The risks associated with building loan customers are relatively low, as the building itself can easily be used as collateral. If there is a moral hazard aspect the save-up concept could play a role. It appears to be a strength of the savings principle that if a customer has already saved a certain amount (and thus put effort in it), in case of default he would not only lose the ownership of the house, but also the savings realised. With the save-up principle, a credit record can be replaced (to some extent) by a "savings record": by the time the

3 The model works similar to the model of ROSCAs described in Chapter 4.

loan is granted the customer has already proven his ability to "put aside" regular amounts from his income.

The market value of houses as collateral does change considerably, however, as a result of factors such as fluctuations in income within the economy, the numbers of houses and flats available, changes in the locality, and property speculation. Nevertheless, it would be true to say that a house or flat can be sold under almost any circumstances.

Although a house might be regarded as a 'consumer durable' rather than an investment, it does generate indirect 'revenues' through the rent that is saved. Considering that in the preliminary 'save-up phase' the customer has to raise both rent and savings, it can be assumed that in the credit phase instalments can realistically be as high as rent and savings together. Further income-generating activities from a house are not at the centre of building associations' considerations.

As the business of building societies is based on a revolving system, refinancing is usually not a big problem provided they can acquire new customers regularly. On the other hand, for those loan amounts that are not covered by the savings deposits, refinancing involves a risk when, as described above, loan interest rates have been fixed years in advance.

The building societies sector in Germany is subject to the "Bausparkassengesetz" (Law on Building and Loan Associations). As this law is also subject to the general German "Kreditwesengesetz" (the German Banking Law), building societies are also supervised by the supervising authority for the German banking system. Also no major restrictions on interest rates etc. are reported that would reduce profitability substantially. Regulations regarding minimum reserves or minimum equity holdings are not found to inhibit business either.

5.3 A concluding view on Technology Financing and Building Society Saving Agreements

From these observations it would appear that MF schemes could be modified and extended. Options for solving the associated problems are furnished by the experience gained in Germany with new technology-based firms and by the analysis of building society loan models ("Bausparfinanzierung") as well as by the concept of co-operation, in the form of a network.

To cope with the high costs of NTBFs and of house-building, ways have been found of increasing the available financing sums and of enabling financing to take place in 'steps'. The financing institutions have acquired the skills to cope with these situations by appropriate measures and by co-operating in expert networks and/or they have specialised accordingly. The need for NTBFs to create an income early on, and to stabilise this income, can be met with appropriate assistance and support.

With house purchase, due to the primary 'consumer durable' nature of the transaction, income can only be generated indirectly through rent savings. There is a high degree of willingness to pay. Particularly with building society models, "credit records" have to be "earned" by regular savings. Real securities used as collateral for equity and loan capital (with NTBFs in the form of machines and plants) and for loans (with building loans, the house itself) do exist – although in the start-up phase of NTBFs the real securities are small. Consideration is given to maintaining their value, and to selling them if necessary. The problem that the volume of funding involved is disproportionately low, compared to the high administrative costs incurred by the loan provider, is partially overcome by subsidies, standardised procedures and the distribution of tasks among other players. It is important that refinancing possibilities are provided, or enlarged, e.g. by public funding. Risks are minimised by good planning (e.g. Business Plan for NTBFs), by expert backup (consulting networks, Business Angels) and by obtaining guarantees. Due to possible risks associated with currency exchange rates, it is mainly the national market that is served. In the short and medium term, societal conditions such as laws, regulations governing the credit sector, but also culturally-determined views, opinions and attitudes, may prove very difficult to change.

6 Complementing MF with principles of NTBF financing and Saving Accumulation for Rural Electrification

MF is a way to finance photovoltaics (PV). However, the existing MF concept should be modified and extended for this purpose, in order to provide new possibilities for solving the problems associated with this application.

NTBF financing can provide possible solutions to the problems that MF seems unable to solve. It can:

- reduce the uncertainties on the MFI side and the customer side, regarding the reliability and economic aspects of the new technology of PV (e.g. by expert networks),

- promote stabilisation and income-generation for PV customers (e.g. "business angels"),
- help to refinance MFI that want to get active in PV rural electrification (through guarantees and their possible "leverage" effect).

Problem areas for which MF provides solutions but which can also be approached by NTBF concepts are:

- reducing operating costs by (temporarily) subsidising management costs of funds for innovation financing,
- distributing/reducing total capital amount to a certain extent by financing different SHS components separately (step by step financing),
- partly solving 'moral hazard' problems (and problems of the non-existence of credit records) by the acquisition of a credit record in the form of a regular saving record,
- providing support for the processes of planning the loan's use and searching for additional income possibilities for periods of low income.

Both MF and NTBF financing still appear unable to solve the following problem areas:

- Risks associated with rural customers and costs for serving long distances are still relatively high.
- Both MF and NTBF financing are focussed on specific financing models

The strengths of saving accumulation are that it

- helps to reduce the amount to be financed and hence the financing time,
- reduces uncertainties for donators, who have a "savings" record instead of a credit record,
- reduces uncertainties for the users, who can prove to themselves that they can regularly put aside an amount of money,
- could serve as an incentive to repay and so reduce moral hazard problems,
- can offer an important finance source for MFI.

Saving accumulation does not seem to provide much assistance with the technical aspects or with regard to the means of adapting to, and encountering, income fluctuations or risks. Its major weakness is the necessity for the customers to continue paying their previous expenses as well while they are accumulating savings to become eligible for a loan. This restricts the market size for SHS. A further disadvantage could be the costs for operating the savings facilities/collecting the savings deposits. If these activities are combined with repayment collection from neighbouring customers or with maintenance and repair work, then costs might be reduced.

7 The "Integrated Microfinance Concept"

The "Integrated MF Concept" is developed with the aim of enabling an easier choice of appropriate players for a certain market approach or identifying the most appropriate dissemination model for certain players – all based on the linking of rural electrification and MF. It is obvious that the "Integrated MF Concept" can only serve as a supportive instrument, as the choice of dissemination scheme or co-operation partners must be decided on a case-to-case basis, and as the appropriateness of a global market approach depends on many components. Additionally, the general recommendations in chapter 3, for example regarding the choice of "good" partners, should always be taken into account.

The decisive criteria which are considered in the "Integrated MF Concept" are the common dissemination schemes hire purchase/leasing and fee-for-service (see chapter 2) as well as the different MFI and investors. All in all, combinations of the MFI and (potential) investors will be discussed against the background of the common dissemination models.

As was shown in chapter 3, various MFI exist with several dimensions. For the "Integrated MF Concept", only the following MFI dimensions will be considered:

Tasks of the MFI	• Collection business • Pre-financing of the hardware • Market information and social approach
Status	• Formal institution • Informal institution
Lending technology	• Individual lending technology • Group lending technology

Regarding the (potential) investors, all different categories as described in chapter 4 will be considered: producers, electric utilities, financial and insurance agencies, NGOs, and the public sector.

7.1 Fee-for-Service

In a fee-for-service model for the dissemination of the SHS, the SHS user only pays for the electric service, will never be proprietor of the PV system, and does not need capital to buy the system. As a consequence, the main activity of the MFI is the or-

ganisation of the collection business. Apart from this, the MFI can certainly be involved in the market information and social approach.

As all MFI, regardless of their status, lending technology, and target group, must take care that the credits disbursed will be paid back, they have organised the collection business. For this reason, no special type of MFI is predetermined to be involved as a player in the fee-for-service scheme – the decisive criteria for the choice of an MFI is the quality of their collection technology and the good performance, confirmed by a high repayment ratio.

Regarding the distribution of obligations among the technical player(s) and the MFI, it is obvious that in a fee-for-service model the bigger part of the investments go to the technical players like the producers, local electric utilities, etc.

Looking at the types of investors, electric utilities are in general predetermined to realise investment in rural electrification based on the fee-for-service approach. Besides, as refinancing of the hardware must be realised by the technical intermediary, there is a strong need for external capital – frequently by finance and insurance agencies or the public sector. Producers and NGOs tend to play a secondary role as investors.

These observations and conclusions can be summarised in the following table, where the most principal combinations are in dark grey, combination of high probability in light grey, and neutral combination marked with an X. It should be stated that all other combinations not mentioned here are not excluded at all in the rural electrification market, as everything depends on circumstances on the spot.

Task	Collection					
	Pre-financing					
	Information		X	X		X
Status	Formal					
	Informal					
Technology	Individual					
	Group					
MFI / Investors		Producer	Electric Utility	Finance & Insurance	NGO	Public Sector

7.2 Hire Purchase/Leasing

In the hire purchase and the leasing model with purchase option, as it is mainly realised, the SHS user does generally need capital to "buy" the systems, to be the proprietor after paying off.

For this reason, for MFI these dissemination schemes open up the possibility to offer a new MF product, a 'Rural Electricity Loan' as described in chapter 3. The main task of MFI is therefore the disbursement of credit, which comprises the pre-financing of the systems and the organisation of the collection business. Again, MFI can also be involved in the procedures to gain information about the market and social approach.

Especially the pre-financing of the SHS limits the choice of MFI which can be involved as a partner in the rural electrification market, as a sufficient financial and refinancing capacity is the pre-condition for the establishment of a 'Rural Electricity Credit Line' for handing out loans to the customers. As only formal financial institutions are allowed to handle savings and have a better access to national and international capital markets, rather formal MFI should offer 'Rural Electricity Loans'. Regarding the lending technology, there is no real preference, as effectively the group targeted is decisive. Yet, countries where a range of various MF loans and technologies exists might show a tendency towards individual loans, as these are often disbursed to comparatively 'higher' income households.

In the hire purchase or the leasing model, both technical and financial players make a strong commitment – the reason why investments will be realised in both fields. Yet, when considering the investment in MFI, financial and insurance agencies play a fundamental role, as investing in a financial institution is 'easy' for them – thinking barriers, lacking knowledge about a new technology etc. do not present a burden, as met when financial institutions invest in new technologies. Other common investors can be the NGOs – especially since many large NGOs with financial capacity and funds for refinancing grew when MF became a fashion in development policy – and the public sector.

Producers will generally rather invest in the technical intermediaries in the rural electrification area.

Observations and conclusions can be summarised as follows:

Task	Collection					
	Pre-financing					
	Information			X	X	X
Status	Formal					
	Informal					
Technology	Individual					
	Group				X	X
MFI / Investors		Producer	Electric Utility	Finance & Insurance	NGO	Public Sector

7.3 Refinancing

As was shown before, involving MFI in the collection business is independent of the dissemination model, as money collection is necessary in any market approach, and the involvement of MFI in this field can be realised in an easy way. The situation for the establishment of a "Rural Electricity Credit Line" is more complex, as MFI will pre-finance the hardware. For this reason, the "Integrated MF Concept" for credit schemes will be enlarged by approaches based on the experiences in Europe, which shall enable MFI to refinance themselves and enter the rural electrification market at a lower risk.

In principle, direct engagement of individual national and international investors in MFI can be envisaged. However, a process of this kind is associated with high risks, particularly if foreign investors are involved. For this reason a refinancing fund (RFF) should be established, offering MFI the access to low-cost refinancing for the 'Rural Electricity Credit Line', and investors the contribution to rural electrification at a lower risk, which is connected to this kind of fund organisation. In addition, appropriate organisation and integration of reliable partners in such a fund enables investors to be sure that the fund and their investments are used in the designated way. This is feasible, provided that the different players could participate in the fund according to their different capacities and considering their specific interests. All potential investors mentioned in chapter 4 are potential participators in such a fund, whereby it is important to achieve a balance between international and national investors.

The following questions should be clarified: what form the refinancing should have (e.g. long-term loan to the MFI), its duration, whether it should be tied to the purpose of the MFI loan (global refinancing loan for PV programmes / RFF loans linked to individual MF investments); regulations about the transfer of the money from the MFI to the PV customers (loan, leasing etc.); terms of loans etc. taken by MFI; modes of payment, duration, size of refinancing loans; risk distribution between MFI, RFF and other bodies (the state); possibilities for providing security and whether there is a form for RFF investors to also set up a guarantee co-operative.

In principle, two forms of refinancing can be envisaged:

- Provision of an "annual budget" (in the form of a global payment), from which the MFI can then autonomously extend individual loans for the financing of SHS,
  - Advantages: lower administrative costs for the refinancing institution and the MFI; faster decisions on the extension of loans by the MFI, since another institution is not involved in the decision,
  - Disadvantages: Refinancing institutions would not be able to control whether funding is appropriately used; limited flexibility for the MFI, if the annual budget

is already exhausted before the end of the year and new funds first have to be given the go-ahead by the refinancing institution.

- The refinancing institute makes a separate refinancing decision about each individual loan the MFI wishes to provide (i.e. refinancing is linked to the individual MF investments);
  - Advantage: broader decision base involving two institutions, possibly less danger of misuse when distributing loans,
  - Disadvantages: possibly more time-consuming decision-making process, plus larger uncertainty about the final outcome of decisions.

As MFI entering the rural electrification market should already be established institutions, the first alternative should generally be realised, since the second one will limit market penetration.

Further aspects of refinancing:

- Proportion of MFI loan to be refinanced: Full refinancing is not recommended, for if the MFI has to participate with its own capital, more care will be taken when making credit decisions.
- Repayment of the refinancing loan (when financing proceeds according to plan): Repayment must be oriented towards the time the capital is tied up in the loans granted by MFI to the SHS user. The most important aspect is the repayment conditions. Two alternatives are possible:
  - Following a redemption-free period (of e.g. 2 years) repayment by the MFI takes place in several yearly or half-yearly instalments,
  - repayment takes place at the end of the period of the refinancing loan.
  - The latter arrangement in effect allows MFI to save up the refinancing sum over almost the whole period of the refinancing loan; however, it has the disadvantage that, on the one hand, the RFF's funds are tied up over a long period and, on the other, there is greater uncertainty as to whether in fact the funds will be (or can be) repaid in one single instalment at the end of the term of the refinancing loan. Thus it is best for the repayment conditions of the refinancing loan to follow the design of the MFI loans to the PV customers.
- Interest rates: Interest rates should be oriented at the interest rate of the micro credits, as the MFI has to cover these costs by income. This also applies to the covering of administrative expenses (e.g. in the period before the loan is granted, when controlling the appropriate use of funds, when selling equipment etc. used as collateral in the case of failure). The interest rate of the refinancing loan must therefore be set considerably lower than that of the MFI loan.

- Risk hedging for the RFF: This can be done through a 'back bond' provided by government agencies (similarly for instance to banks acting as guarantors in Germany: the risk is shared by the federal government and the government of the federal province in which the guarantor bank is active). Alternatively risk hedging could be done via guarantor banks and credit guarantee associations.

The following model represents a different approach: MFI acquire capital on the capital market or from the funds of international organisations, and a guarantee for this capital is accepted by an institution acting as guarantor (similar to the guarantor banks and credit guarantee associations in Germany, or a government agency). These agents guarantee repayment of the acquired capital to the capital market or fund.

- Advantages: The institution acting as guarantor is only called upon if a PV project fails. Possibly more use might be made of international funds.
- Disadvantages: The work of the MFI is dependent on the state of the capital market (liquidity, interest rates) and on the availability of funds. Under some circumstances it may not be possible for capital to be made available cheaply enough for the financing of PV systems, since interest rates on the capital market may be higher than the refinancing interest rates in the previous case.
- Design: The institution acting as guarantor (the 'guarantee association' covers a part of its expenses (administration and potential losses) by means of a guarantee commission. Since in principle (i.e., under conditions that could be compared to those in Germany) the financing of the sales of PV systems would not be a high-risk business, it would be possible – after a start-up phase of several years with substantial subsidising of the guaranty side – to reduce these subsidies considerably.

Further design could be similar to the refinancing loans.

7.4 Principles and advantages of the Integrated Microfinance Concept

To start with an integrated microfinancing concept, it should be mentioned that, for the following mechanisms to be involved in the financing concept, public authorities can play an important role.

The integrated financing concept introduces instruments such as a "save-up model" to handle the comparably large volume of credits etc. and long-term repayment obligations of the SHS investment for customers in rural areas; it reacts to income uncertainties and fluctuations by adapting repayment cycles and creating possibilities for additional income during "non-harvest" times. Local "income experts" should be trained to

give advice (in advance to new business activities) and assistance (during these activities); these experts could be paid by governmental institutions. For the support of the SHS users, respectively the MF clients, income prospects by the SHS (e.g. working after dark, learning to read) should be elaborated in this context. Also assistance in legal matters (work permit, legal recognition of certain personal assets etc.) should be considered.

Furthermore, the concept reduces moral hazard risks and replaces credit record by the "traditional" MF mechanisms of peer-group lending, repeater loans and references, where this is feasible. The possibility to get a loan for replacement components like the battery, as well as the save-up model can reduce the moral hazard risk, and at the same time serve as a kind of track record and "train" the users in paying regular amounts.

It ensures during the credit terms that the SHS is functioning and the collateral is secured, as the PV company must realise reliable operation and maintenance service in order to benefit from a long-term success in the market; and it uses and implements expert networks to provide information on the prospects of PV and technical training for MFI staff.

Finally, financing in this way also reduces uncertainty for the SHS users regarding the application of this new technology by the "good" reputation of the MFI, and it decreases (to a certain extent) the additional costs associated with serving rural customers by employing standardised loan approval and monitoring principles - as it is already common practice in the MF business.

8 An Integrated Concept for –Microfinancing: what can be learnt for Central and Eastern European Countries?

Innovations, particularly in small or new technology-based firms, play an important role in enabling central and eastern European countries (CEECs) to adjust to the global economy. The innovation financing market in CEECs is insufficiently developed. It would seem valuable to use appropriate new financing schemes in these countries in order to make sufficient volumes of financing with long repayment periods available. The use of financing for this purpose should especially include experience also from the MF business.

To support the development of new technologies in CEECs, it is not only necessary to establish new institutions specialising in VC. Appropriate organisations also need to be available for regular saving and for the collection of capital. The existing credit sector has to acquire appropriate capabilities for assessing the techno-economic and profitability potential of innovations. This can be achieved by building up its own technological competence (e.g. technology specialised VC funds), and/or by co-operating with appropriately qualified experts (e.g., via networks). Apart from this need for qualification, additional skills are required in dealing with specific institutions and financing instruments which up to now have not been a part of banks' core activities. In this context management capabilities also appear to be important, for the operating of

- a 'mix' of instruments (e.g. public subsidies in combination with equity, loans and guarantees),
- 'phase-related' financing or partial financing of activities in several steps according to (work-related) success, involving fairly small sums in each case and possibly also various financing instruments,
- the complex interaction of the various players, e.g. in a network.

Experiences of this kind of financing also seems important in CEECs because incomes in these countries are not stabilising or growing fast enough, or on a broad enough base, to ensure dynamic economic development in the short to medium term. For this reason, public subsidies for interest rates and/or other public programmes to reduce the financing burden for foreign investors and distribute financing over longer periods are probably important, for investment financing itself and for the selection of innovative investments.

In several CEECs it is possible that the 'socialistic' inheritance may still complicate people's perceptions of a commitment to pay back money to 'capitalistic' institutions, such as banks. Thus in CEECs, too, it is certainly appropriate to consider e.g. informal credit security arrangements or similar mechanisms, as used in micro-financing. The habits – often habits of carelessness - formed over many decades of dealing with 'socialistic' property might make it desirable (as in the case of micro-financing in developing countries) to set up special control mechanisms for the care and maintenance of the machines and mechanical plants acquired through MF. In this way, the real securities will retain their value and the possibilities of re-possession and re-sale will remain open, to the loaner's advantage.

The financing of innovations is labour-intensive and is more cost-intensive than normal investment financing projects. Public financial assistance for financial management in projects of this kind, in a similar form as the support given to VC companies in Western Europe, or the planned (partial) bearing of the costs of peer groups and ex-

perts – as in developing countries – would seem appropriate. Funding is always 'limited'.

The mobilisation of endogenous resources as well as of re-financing possibilities, the extension of guarantees to enhance access to international private capital, and/or assistance funding following the model of the integrated financing concept also represent a chance for CEECs. Also the existing general risk factors can be limited by pro rata financing from the loan recipient's own resources (e.g. by regular savings done in advance for this purpose), again by the (partial) taking over of guarantees, and by good project planning and support for the recipients of financing loans (possibly as a part of other financing activities, similarly to collection procedures in developing countries). Currency fluctuation risks should be minimised by a high proportion of national production.

One aspect found in several CEECs as well as in developing countries is that the politico-legislative situation tends to be unclear. Another consideration is that present conditions in CEECs mean that a law's existence does not in itself constitute a guarantee of enforcement. Thus informal mechanisms and self-help activities are beneficial for financing activities in CEECs, too. Innovation financing initiatives in the form of co-operative associations (e.g. NGOs) would seem particularly appropriate for CEECs since a tradition of this kind – albeit in a distorted form in the communist era – already exists.

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