SPREP

Pacific Islands Renewable Energy Project

A climate change partnership of GEF, UNDP, SPREP and the Pacific Islands

GEF

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PIREP

our islands, our lives...

The Secretariat of the Pacific Regional Environment Programme

FINANCING MECHANISMS FOR RENEWABLE ENERGY DEVELOPMENT IN THE PACIFIC ISLANDS

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ACRONYMS

ACP	African, Caribbean and Pacific countries (associated with EU)
ADB	Asian Development Bank
ADO	Automotive Diesel Oil
AREED	Africa Rural Energy Enterprise Development initiative
BCF	Bio-Carbon Fund
BEE	Black Economic Empowerment
BREED	Brazil Rural Energy Enterprise Development initiative
CDM	Clean Development Mechanism
CEB	Ceylon Electricity Board
CER	Certified Emission Reduction
CDCF	Community Development Carbon Fund
CO_2	Carbon dioxide, a key greenhouse gas
CREDP	Caribbean Renewable Energy Development Programme
CREED	China Rural Energy Enterprise Development initiative
CREF	Caribbean Renewable Energy Facility
CROP	Council of Regional Organisations in the Pacific
DAC	Development Assistance Committee
DOE	Department of Energy
DSM	Demand Side Management
EC	European Community
EDF	European Development Fund
EMT	External Management Team
EPC	Electric Power Company (Samoa)
ERUPT/CRUPT	Netherlands National Carbon Fund
ESCAP	Economic and Social Commission for Asia and the Pacific (UN)
ETEF	Empowerment Through Energy Fund
EU	European Union
EWG	Energy Working Group of CROP
FEA	Fiji Electricity Authority
FSM	Federated States of Micronesia
GEF	Global Environment Facility
GHG	Greenhouse Gas
GOSL	Government of Sri Lanka
GRIP	Guaranteed Recovery of Investment Principal
GS	Grameen Shakti
GTZ	Deutsche Gesellschaft für Technische Zusamenarbeit (German Technical Cooperation)
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IFC	International Finance Corporation
IMF	International Monetary Fund
IPP	Independent Power Producer
JICA	Japan International Cooperation Agency
JREC	Johannesburg Renewable Energy Coalition
MDG	Multilateral Development Bank
MDG	Millennium Development Goals
MIGA	Multilateral Investment Guarantee Agency
NGO	Non-Government Organisation

O&M	Operation and maintenance
OECD	Organization for Economic Cooperation and Development
PCF	Prototype Carbon Fund
PCI	Patient Capital Initiative (and also Participating Credit Institution)
PDMC	Pacific Developing Member Country (of ADB)
PEDP	Pacific Energy Development Programme (UN 1982-1991)
PIC	Pacific Island Country
PICCAP	Pacific Islands Climate Change Assistance Programme (GEF/UNDP)
PIREP	Pacific Island Renewable Energy Project (GEF/UNDP)
PITCO	Pacific International Trust Co., Ltd.
PNG	Papua New Guinea
PPA	Pacific Power Association
PREGA	Promotion of Renewable Energy, Energy Efficiency and GHG Abatement (ADB)
PV	Solar Photovoltaic
PVMTI	Photovoltaic Market Transformation Initiative
REEP	Renewable Energy and Energy Efficiency Programme (ADB 2004-2006)
RERED	Renewable Energy for Rural Economic Development
RESCO	Renewable Energy Service Company
RET	Renewable Energy Technology
SEC	Solar Energy Company (Kiribati)
SEEDS	Sarvodaya Economic Enterprises Development Services
SELF	Solar Electric Light Fund
SHS	Solar Home System
SIA-SL	Solar Industries Association - Sri Lanka
SIDS	Small Island Developing States
SME	Small to Medium Enterprise
SOPAC	South Pacific Applied Geoscience Commission
SPC	Secretariat of the Pacific Community
SPLC	Solar Power and Light Company (Sri Lanka)
SPREP	Secretariat of the Pacific Regional Environment Programme
SWH	Solar Water Heater
TAC	Technical Assistance Committee
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UPC	Uva Provincial Council
US	United States
USAID	United States Agency for International Development
VAT	Value Added Tax
VLIS	Viti Levu Integrated System (FEA)
WB	World Bank
WSSD	World Summit on Sustainable Development

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1 INTRODUCTION

This report is the outcome of a series of studies conducted under the framework of the Pacific Islands Renewable Energy Project (PIREP) – a climate change mitigation partnership of the Global Environment Facility (GEF), the United Nations Development Programme (UNDP), the Secretariat of the Pacific Regional Environmental Programme (SPREP) and Pacific Islands Countries (PICs).

PICs are currently heavily dependent on fossil fuels. Renewable energy (RE), mostly hydro, is estimated to contribute less than 10 percent of each PICs commercial energy use. The region is characterized by scattered and fragmented efforts to promote RE technologies that are based on unreliable and unsubstantiated data on RE resource potentials. PIREP aims to facilitate within PICs the promotion of widespread implementation and eventually commercialisation of RE technologies (RETs) through the establishment of a suitable enabling environment. The establishment of an environment conducive to the region-wide adoption and commercialisation of RETs would involve the design, development and implementation of appropriate policies, strategies and interventions addressing the fiscal, financial, regulatory, market, technical and information barriers to RE development and utilization. It also involves the development of interventions for strengthening relevant institutional structures and national capacity for the coordination and sustainable management (design, implementation, monitoring, maintenance, evaluation and the marketing) of RE initiatives in each country and territory.

A RE assessment study[1] conducted by the PIREP in 15 PICs identified, among others, the absence and the lack of appreciation of innovative financing mechanisms which finance RE initiatives as a major financial barrier to the RE development in the region.

This report concentrates on explaining the financing possibilities and requirements for accelerating renewable energy development in the PICs and on financing mechanisms that can be employed for supporting renewable energy in the PICs that would be suitable for GEF support and support by other international funding agencies.

1.1 Context for renewable energy finance

A sustainable financing mechanism for renewable energy must be tailored to the needs of the market as well as the capacity of the existing finance sector and therefore the design of the mechanism must take into account:

- the demand for energy and the available energy technologies in each country;
- the state of the market of all the appropriate RETs; and
- the status of the finance sector in each country relative to finance of renewable energy technologies.

These factors were included in the individual country reports, although information on the finance sector in each country was not given strong emphasis and added information may need to be gathered before implementing specific financial programmes. The experiences and lessons learned from financing schemes in the PICs, other Small Island Developing States (SIDS) and other developing countries have been summarised. A list has been prepared of the

[1] This study produced 15 Country Reports and a Regional Synthesis.

financing mechanisms potentially available for renewable energy development in the PICs, and the financial institutions that thus far have provided funding for RETs in the region.

An appropriate financing scheme is proposed for the region that is designed to provide the necessary flexibility needed to fit the varying country requirements while addressing the removal of financial barriers to further RET development.

2 REVIEW OF THE PICS AND SUITABLE RE TECHNOLOGIES

The PIREP country reports identify the potential of the various renewable energy technologies available to the PICs, the experience to date with renewable energy and the types of finance used.

Although rural electrification using solar PV has been the principal focus of renewable energy development in many of the PICs for two decades, one of the important points noted in the PIREP reports is that to date there have been few rural renewable energy rural electrification schemes in the Pacific where the recipients have been able to pay back much more than the operation and maintenance (O&M) costs of the scheme. This has been because:

- the technical and administrative capacity of the region/country has needed to be increased for the project to be a success. The capacity building has usually cost more than estimated in the initial stages and the ongoing provision of this capacity building was underestimated and therefore was inadequate;
- the capacity to pay of much of the rural population is not sufficient to cover the full cost of service, a situation common to almost all developing countries with regard to rural electrification of all types;
- the nature of many of the projects and the combination of components into a system have been pilot in nature and more problems have arisen than would be expected with well proven technical and organisational systems thereby increasing the cost of operations;
- there was no provision for changing of components when initial components proved inadequate leading to a short project life;
- exchange rate changes and increased transport costs have increased maintenance costs over those anticipated since many of the components of the installed renewable energy systems are imported from outside the region; and
- the solar PV systems that are practical for rural electrification in the PICs can only offset the use of kerosene and dry batteries now being used in rural areas for lighting and entertainment use. The amount that is acceptable for payment for PV system use is essentially that presently being paid for kerosene and dry batteries. That amount has been shown to be around US$10-15 per month for most PICs while the cost of repayment of all costs for PV system implementation exceeds that amount under the most favourable terms practical for rural electricity supply, that of fee for service programmes.

For these reasons, it is unlikely that any rural electrification scheme using renewable energy can provide significant impact without substantial input from the PIC governments in the form of capacity development, direct financial subsidy and a favourable tax and regulatory environment. To date, only Fiji, mainly through its GEF funded RESCO development project, has developed the policies, designed the necessary regulatory structures and

considered the requirements for the capacity development needed to implement large scale rural electrification using renewable energy. The primary barrier to further progress in Fiji is arranging for the capital needed for implementation and capacity development.

Other PICs requiring major rural electrification efforts have a number of additional barriers that stand in the way of large-scale rural electrification through renewable energy and the provision of finance alone will solve only part of the problem. In those countries, notably the Federated States of Micronesia, Marshall Islands, Papua New Guinea, the Solomon Islands and Vanuatu, finance should be a component of a larger programme that addresses capacity, regulatory and policy barriers as well as the financial barrier that obviously exists.

For most PICs, including those with large rural electrification needs, the most effective use of financial resources for advancing the development of renewable energy for GHG purposes appears to be through the finance of Independent Power Producers that use biomass, hydro, geothermal and wind power to feed energy into the national grid and for developing biofuel resources to allow utilities to replace substantial amounts of the diesel fuel currently used for power generation. Therefore the financial measures proposed include substantial capacity for supporting IPP finance.

3 REVIEW OF FINANCE MECHANISMS

3.1 Debt Finance

Loans, or debt finance requires repayment of both the principal sum borrowed and interest charged on that principal. Finance institutions will generally only provide debt finance to projects and project developers once the market is mature and therefore may need encouragement to enter the market. Debt finance can be provided to local finance institutions to allow them to on-lend to consumers, to project developers, or debt can be provided directly to a project developer. The debt must be repaid whatever the outcome of the project.

International funds dedicated to development projects such as are provided by Multilateral Development Banks (MDBs) will often create loans with generous repayment terms, low interest rates and flexible time-frames, such loans are called "soft-loans".

Investment and commercial banks can lend money against the assets of the project. In the event of defaulting on the loan the bank can have no other claims other than the assets of the project. This type of financing is based on long-term commercial loan contracts.

3.2 Equity Financing

Equity financing consists of selling an ownership interest in the project to investors. Investors will expect high returns on their investment and some control of the organization since they share the risks with the primary owner. An investor's stake is represented by shares which give the shareholder residual ownership in the assets and earnings of the project after all other debt and creditor obligations have been paid. Since it is high risk the expected rate of return is high, usually greater than 15 percent. Debt finance is generally only available when the market is mature or equity is already be in place. Therefore equity financing of an organization or project will help them to attract debt from local finance organizations.

Quasi-equity financing is a financing term for funding that is technically "debt" but has some of the characteristics of equity financing, such as unsecured funding with flexible repayment terms. Stakeholders in a project may loan the project money with a formal postponement of repayment[i].

Equity finance is mostly provided for well established technologies. The risk is high for equity investment in companies using unconventional technologies and only a few specialised venture capital funds will consider renewable energy equity investment and then typically only a small percentage of total equity. None of those venture capital funds (e.g. Triodos has equity finance available for qualifying renewable energy companies) presently service the PICs due to the small markets and limited possibilities for quality investment in renewable energy.

Since equity finance is not considered practical through GEF programme funding and is unlikely from other public sources available to the PICs other than through limited private finance programmes of the Asian Development Bank (ADB), equity finance will not be considered further in this paper though private sources may be available and should be considered by developers of renewable energy technologies on a case by case basis.

3.3 Debt Financing Structures

There are a number of types of finance mechanisms possible for renewable energy projects. These can be broken into five main types.

- Consumer Finance – small loans for renewable energy system purchase where the end use of the energy is for households. This type of finance is characterised by high interest rates, requirements for security (collateral assignment, co-signers, equipment mortgages) and short loan terms due to high transaction costs per unit of loan and relatively high perceived risk to the lender. Commercial banks, credit unions and micro-finance institutions are typical consumer lenders.
- Utility Finance – Finance for public utilities to utilise renewable energy for generation. In the Pacific this is mainly for hydro development though wind energy and biofuels are currently being developed by Pacific utilities (e.g. FEA in Fiji and EPC in Samoa). Typically finance is sought at concessionary rates over a long term from international finance agencies such as ADB, local governments and capital investment funds such as public pension funds.
- Commercial Finance – Finance for commercial operations to finance renewable energy activities. In the Pacific commercial finance can be for agricultural processing facilities that utilise biomass wastes for heat and power (e.g. Fiji, PNG, Vanuatu, Samoa, Solomon Islands), development of biofuels (e.g. Vanuatu, Samoa, Fiji), for tourist facilities to install solar water heating and sometimes solar electricity (e.g. Fiji, Palau, Samoa) and for mining operations to develop local renewable resources such as hydro and geothermal (e.g. PNG)
- Financier Finance – Funding allocated for renewable energy development to fund micro-finance agencies, development banks, commercial banks and other local finance institutions.
- Bilateral and multi-lateral grant financing – Funds provided with no requirement for repayment, typically for pilot and demonstration projects or for technical and capacity building assistance related to renewable energy development.

The most appropriate arrangement for finance will depend on the type of financing barriers that currently exist and the state of the renewable energy market in each country.

3.4 Consumer Finance

The lack of access to affordable finance is often seen as one of the main barriers to widespread dissemination of modern energy services in rural areas – although in most cases there are other barriers to market development such as a lack of confidence in the technology and poor after-sales support so that merely making finance available may not have as great an impact on the market as hoped.

The rural population of the PICs typically has a low cash income. Renewable energy installations generally require a high initial investment though they tend to have moderate operation and maintenance costs. As shown in Fiji rural household surveys, the total life cycle cost of renewable energy technologies that can replace fossil fuel and battery use in rural areas is generally higher than present expenditures for the fossil fuels and batteries already being used by the rural population. Also, the initial cost of the renewable energy equipment is so high that few can afford to purchase them. This high first cost limits cash purchase for renewable energy equipment to the wealthiest of the rural population. Estimates by the Solar Development Group (SDG)

in 2002 were that direct sales of PV equipment for rural household electrification was likely for no more than five percent of developing country rural households. With five year credit finance, that estimate rose to fifteen percent. With long-term finance through fee for service operations, a market penetration rate of 50% or more was estimated and has been found to be possible in practice.

3.4.1 Lease purchase (hire-purchase)

In a lease-purchase arrangement, renewable energy equipment is provided under rental terms for a lease period during which full ownership and maintenance responsibility remains with the supplier. After completion of the lease period when the required capital repayment has been made, ownership is transferred to the recipient.

This financing approach has been used in renewable energy projects outside the Pacific with some success but so far not in PICs though the Namara, Fiji, EU funded PV electrification project of 1994 had a similar concept. For that project, for 10 years villagers were to pay a small monthly fee for the use of the PV equipment that belonged to and was maintained by the Department of Energy then after 10 years, ownership was to be transferred to the individual households. However, there was no capital recovery – the fees collected did not even cover O&M costs.

Advantages.

- After sales support has to be provided thereby improving project sustainability. Consumers have to be provided full maintenance support during the term of the lease thereby requiring companies to develop the necessary field infrastructure for good after-market support.
- Better market penetration is achieved through lower periodic payment requirements. Since the equipment remains the supplier's property until payments are completed, the term of the finance can be longer than conventional finance where the supplier has less control over the supplied equipment.
- Matches nicely as a sales supplement for RESCO type operations. Allows the sale of larger systems to users in RESCO serviced areas with no added investment for field service facilities.

Disadvantages.

- Capital requirements are high for the company. The company finances the capital investment for the term of the lease which typically is five years or more.
- After the lease term is completed, professional maintenance ceases. The user must take over all maintenance of the systems. The systems are maintained professionally for the lease period during which there is little or no user responsibility thus there will probably be a lowering of maintenance quality after the lease period is completed. Since the requirements for maintenance tend to increase with project age, the quality of services from the renewable energy equipment is likely to seriously degrade after the lease term is completed.
- This approach is only reasonable for fairly large projects. There must be a large value of systems installed by a company to make the development of sufficient field support capacity financially practical. Also the installations need to be concentrated in area to keep access costs down.

3.4.2 Consumer loans made through commercial banks

Loans are typically secured by collateral or a mortgage on the items being financed. In the Pacific this approach is used for vehicle purchase, house purchase and the purchase of expensive durable goods such as major appliances. Due to the difficulty of collecting repayments in distant rural areas, this type of finance is focused on urban households where salaried workers are the norm and where finance institutions have offices and agents. This finance method is rarely available for renewable energy equipment except for solar water heaters. For other types of renewable energy equipment or for rural borrowers, risk reduction incentives such as loan guarantees are needed, at least in the beginning.

Advantages.

- Responsibility to repay the loan rests with an individual and collection is easier than with a community or committee purchase.
- There are well established processes for loans by local banks.

Disadvantages.

- Most banks will not use the equipment purchased as the collateral to secure the loan since it is typically fixed to the house (e.g. solar water heater) and costly to move or is located in distant rural areas and difficult to repossess. Further, the market for used consumer grade renewable energy equipment is not well established and repossessed equipment could prove difficult to sell.
- The land tenure situation in PICs often does not allow land to be used as collateral and no other asset held by a rural household may be of significant value as collateral.
- To reduce risk, a large down payment is often required and that is difficult for most rural households to arrange.
- The term of consumer loans are usually relatively short (one-three years) meaning high periodic payments are necessary.
- Enforcement of payment collection for rural customers is difficult for urban banks. Collection costs are high.
- This approach does not provide for long term maintenance, typically after sales support is only to the extent of the system warranty which is often set at one year.

3.4.3 Consumer loans through rural "micro-finance" organizations

Small scale finance for rural consumers and "cottage" businesses is being offered in several Pacific Islands through non-government organizations (NGOs) and, in the case of Fiji, by "roaming" agents of commercial banks. By maintaining a presence in rural areas, transaction costs can be kept low and by using payment terms that fit the needs of rural households, the repayment rates can be kept high. Although to date the PIC micro-finance organizations have not been financing renewable energy technology for rural areas, for household and "cottage" business use it is a finance option.

For Melanesian countries, where there are large rural populations without electricity, there appears to be a developable market for micro-finance of renewable energy systems, notably small PV based home lighting systems, for the more affluent rural

households. It is recommended that this be a component of a renewable energy finance package for the region.

Advantages.

- The loans are designed specifically with rural financial requirements in mind so that repayment terms are acceptable to rural households.
- Little or no collateral is typically required.

Disadvantages.

- Loans are not generally for long periods and payments for the purchase of renewable energy equipment remain too high for the majority of rural households in the region.
- Micro-finance programmes often are short lived and focused on narrow rural development goals.
- Until there are a sufficient number of renewable energy systems in place in a rural community to justify locally based technical services, maintenance support for the technology will likely be expensive and slow.

3.4.4 Loans through savings associations and credit co-operatives

Loans are typically unsecured or only partially secured. Terms are typically better than commercial consumer loans but are limited to members of the association or cooperative.

Rural credit through agricultural cooperatives is common in some PICs. For example, in the Marshall Islands, copra is typically sold through a cooperative with the proceeds going into a Majuro account held by the cooperative on behalf of the seller. Arrangements can be made through the cooperative for making payments from those accounts to Majuro equipment dealers who have provided credit sales to the rural customer.

Advantages.

- Local agencies that deal directly with rural customers on a regular basis are more likely to have low transaction costs and to collect payments than a distant, impersonal finance institution.
- Convenient for customers since payments are usually made at the time income is generated and payments can usually be made directly to an urban dealer's account automatically and without transfer cost.

Disadvantages.

- Cooperatives and community savings associations are poorly regulated and typically are managed by non-professionals making the quality of services highly variable and the availability of loan services is often more dependent on social, political and personal factors than on the ability to repay loans.

3.4.5 Fee-for-service

In a fee for service finance arrangement, ownership and maintenance of the equipment remains with the supplier and the recipient pays a periodic fee for the services received. Fees include components for capital recovery, maintenance, administration and profit. The result is similar to a lease purchase arrangement with a non-terminating lease. This allows the capital cost to be financed over a very long

period, 15 years and more, making the periodic payment much lower than would be required for short term finance. This approach is well geared to a programme where a capital rich organization (for example government) provides the capital investment and becomes equipment owner and another field oriented technology organization (for example a technical company) manages the installation, operation and maintenance of the project.

This is the general structural form for most of the longer term solar based rural electrification projects of the Pacific in which the capital cost is typically provided to the operating company as a grant. The longest running fee for service operator is the Solar Energy Company of Kiribati (SEC) that reorganised as a fee for service company (Solar Utility) in 1989 and currently has approximately 2000 household installations under its administration. The SEC has been provided the solar equipment for their rural household installations as a grant (initial trial systems were provided by JICA but the bulk of the installations were funded by the EU). The fees collected therefore do not include capital recovery costs, only O&M, administration and a component for payment into a battery replacement fund.

A GEF project for Fiji (implemented by the Fiji office of UNDP) developed a complete structure for what they termed RESCO (Renewable Energy Service Company) development. The core concept is creation of a public/private partnership. The Department of Energy (DOE) would purchase the solar equipment and make the systems available for subsidised lease by qualified RESCOs. The RESCOs would market the leased systems, install them and collect the fees necessary to cover their costs and profit as well as to pay the DOE lease fee and an amount to go into a component replacement fund that would ensure that sufficient funds will be available for battery and major component replacement when needed. The concept is under trial with several hundred systems (financed by grants from Japan) installed in rural Vanua Levu. A Labasa based RESCO has been contracted to provide the necessary project operational support. Funding is being sought to finance a "proof of concept" project that will include several thousand installations on both Viti Levu and Vanua Levu. Under the present rural electrification policy structure, 90% of the capital cost is covered by government with the capital repayment amount limited to 10 percent.

This approach is well suited for international finance agency participation and finance for fee for service type rural electrification is proposed as an important component of a renewable energy finance package for the PICs.

Advantages.

- Greatest market penetration of all finance approaches since the very long term finance allows for the lowest possible periodic payments.
- Maintenance is provided by professional staff on a regular schedule providing high system reliability, quality service and long term sustainability.
- Low risk to the customers since they have no significant investment in equipment so if they do not like or cannot pay for the service, there is little lost by the customer if they disconnect.
- System design has to be based on life cycle cost, not initial cost as with direct sales, so higher quality and more reliable equipments are generally installed than those offered by sales oriented companies.
- Large quantity purchases of components encourages local manufacture and provides bargaining power when dealing with external suppliers.

Disadvantages.

- High capital investment is required since capital payback may take 15 years or more.
- Significant administrative and field support costs are involved. To keep the customer fees low, this approach is best when there are a large number of installations (1000+) so that the fixed costs can be spread over a large customer base.
- Difficult to control the installation and maintenance quality for many systems spread across large distances. There is a need to enforce standards and certification regulations that RESCOs are required to follow.
- A strong policy for non payment is necessary is difficult to enforce due to cultural constraints and the need for enforcement to be by locally hired staff who are reluctant to enforce non-payment penalties for friends, family and persons with local political power.
- Requires customers to accept the concept of rental for the energy production equipment and to permit access for maintenance and allow disconnection or removal for non-payment.
- Must be comparable or cheaper than non- renewable energy costs for similar levels of service.
- Operations cannot be centralised. Field offices cannot be closely supervised regarding maintenance procedures, fee collections and customer interactions.

3.4.6 Supplier credit

With dealer credit, the supplier offers credit to the consumer usually using the financed items as collateral. Terms are typically short and a high interest rate is charged. This approach is often called "easy payment" sales. This has been successful for sales of high cost consumer equipment, such as large household appliances, to urban consumers but the renewable energy market niche is small and this approach does not presently represent a major financing mechanism for renewable energy in the PICs although there is potential in some countries for its use in the sale of solar water heaters for urban households.

This approach is only practical for a large diversified dealer since a credit department has to be established and effectively a part of the company must act as a loan institution. Dealer credit also ties up company capital during the loan repayment period and the small companies likely to be operating in the renewable energy field usually do not have sufficient resources for that to be practical. Therefore this is not a mechanism for consumer finance likely to be appropriate for developing renewable energy in most of the PICs.

Advantages.

- The perceived risk of the technology not being suitable is reduced. The customer feels supported by the seller and trust for the technology is higher.
- There is an ability to reach more customers since the payment can be spread over many months.

Disadvantages.

- The company has to establish a full credit department to determine creditworthiness of applicants, collect payments and prosecute defaulters.
- Finance is usually short term so it does not cater to lower income households that require low periodic payment.
- Business capital is tied up for the period of the finance greatly reducing the number of sales that can be made relative to cash sales with the same capital amount available.
- Small businesses may find it hard to access and collect from defaulting customers.
- The equipment must be properly installed and reliable for at least the repayment period. People will not pay for renewable energy systems that do not work well.

3.4.7 Employer finance

This mode is used by employers to install renewable energy equipment for the use of employees and allow repayment over an extended period with payments automatically deducted from wages earned by the recipients.

Several thousand solar home systems are claimed to have been financed for resident workers on large plantations in PNG through this approach. Funding the installations usually is not a problem for the plantation owners and providing special external finance for such applications is not considered likely to significantly increase the rate of implementation of renewable energy in the PICs.

Advantages.

- Guaranteed repayment since payments are deducted from employee salaries.
- The parent company usually employs technical staff who can include maintenance of renewable energy equipment as part of their tasks.

Disadvantages\.

- Not expandable beyond company employees.
- Priority for local technicians to do maintenance is typically low.
- Generally there is no choice of options by recipients. Installation size and type is determined by the employer.

3.4.8 Subsidy to consumers

Subsidies are provided by a public agency directly to consumers to encourage expansion of renewable energy use. The subsidies may be in the form of interest rate reduction for loans, loan guarantees, tax credits, direct rebates, extended warranties or other risk abatement concepts. Consumer financial incentives by the Cook Islands Government are to some extent responsible for the wide spread use of solar water heaters in Rarotonga households.

The success of the solar water heater incentives in the Cook Islands probably can be replicated in other of the higher per-capita income PICs though different mechanisms may be necessary in different countries. The urban areas of all the PICs would be reasonable targets for such incentives and the solar water heater demo project proposed in another document of the PIREP series would include subsidies intended

to encourage consumer use of the technology as well as capacity building support for the businesses providing the equipment.

Solar water heating is not a technology that is likely to have great impact on GHG production in the PICs though there is definite value in replacing existing electric water heaters and avoiding the installation of new ones. In most PICs, low energy use demand type heaters are more likely to be used than high demand storage type water heaters. Thus replacing the demand type heaters with solar water heaters can be expected to have a relatively small impact on the national energy use though it can have a significant benefit to utilities through the reduction of load peaks.

Advantages.

- Typically there is a quick response by households as it directly impacts price.
- Requires little new infrastructure to implement.
- Often cheaper than other types of renewable energy development programmes that provide similar end results.
- Increases the market so that businesses can develop more support infrastructure.

Disadvantages.

- Distorts the market.
- Can only be a temporary measure and provision needs to be made for gradually reducing subsidies over time so there is no serious market shock due to sudden loss of a major subsidy.

3.4.9 Subsidy to dealers

These are subsidies provided by a public agency to encourage the participation of businesses in the development of renewable energy. They may be in the form of reduced import duties, loan guarantees, low interest capital loans, preference for government purchasing, marketing assistance, subsidised employee training programmes, tax relief, direct subsidy for the purchase of renewable energy equipment and other incentives for business participation. Dealer subsidies have tended to improve profitability of renewable energy businesses and to encourage private company participation. While this may result in more efficient delivery of renewable energy services than can be provided directly by government agencies, rarely have they resulted in significant market expansion since the incentives are usually not passed on to consumers in the form of lower cost systems.

Advantages.

- Helps private companies stay in business during the start up phase when the market is weak.
- Relieves the pressure on government to provide the services.

Disadvantages.

- Operational efficiency is not encouraged.
- Does not expand the market base if subsidies are not passed on to customers as better service or lower price.
- Easily abused to increase company income with no resulting national benefit.

- Difficult to determine the real value of the subsidies relative to their purpose of increasing the use of renewable energy.

3.4.10 Revolving funds

A revolving fund is where a loan fund is replenished by borrowers as they repay their debt. This form of finance is often used in the agriculture sector for the purchase of seeds and fertiliser with repayment made at harvest time and is managed by a cooperative or community committee. The fund is deemed to be self sustaining because with the continuing repayment of funds, new loans can be made. A small transaction charge or interest charge is used to pay the cost of managing the loan pool and to offset the risks of inflation, loan defaults and cost of capital.

Advantages.

- If community owned and controlled, a greater personal commitment can be expected not to default on repayments.
- Good for stimulating growth of income generating projects that have a short cycle of turnover such as for agricultural finance.

Disadvantages.

- Not good for long term finance especially where imported goods are involved and there is a substantial foreign exchange risk.
- Seed capital must be maintained and often it is lost within the first round of loans. In practice most developing country revolving funds for renewable energy finance have not provided for significant second rounds of investment because the capital disappears before "revolving" can occur. This is due to many problems including exchange rate fluctuations, inflation, defaults on loans, administrative costs that are excessive, use of recovered funds for other community activities, poor fund management, corruption and outright theft.
- Interest rate charged by the fund for covering loan costs is typically underestimated when longer term loans are involved. It has to cover the cost of administration, training of management committees, administrators of the credit scheme, marketing to expand the number of clients, inflation and exchange rate fluctuations.
- If the fund administers the O&M side of the technology, as in a lease purchase arrangement, then training and employment of installation and maintenance staff is another cost that has to be covered by the interest.
- Turnover, the time it takes to recover the money for a new loan, is determined by the time period of loans. For renewable energy projects, this may be five or more years making expansion of the project quite slow even if the full cost of managing the fund can be recovered and there are no unexpected costs during the long loan term.

An example is the Sukiki solar lighting project promoted by the Solar Electric Light Fund on Guadalcanal, Solomon Islands. Reinvestment has not occurred during the years of the project due to many unforeseen factors including non-payment by recipients, political upheaval, major currency devaluation, use of recovered funds for other purposes and poor management.

3.4.11 Community based credit – Rural credit co-operative

Rural Credit co-operatives are essentially mini-banks. They are focused on the local community concerning loan requirements, their client base and repayment schemes. They require customers to first establish a savings account and build a good reputation for good management of personal finances. They have to have low operating costs and good management to be self sustaining. They can either provide loans to customers to purchase RE technologies or they can be directly involved in implementing projects where the technology is owned by the co-operative.

Advantages.

- Ability to provide credit to for small scale borrowers.
- In depth knowledge of local clients.
- Low transaction costs relative to an urban based finance institution.
- Less complicated bureaucracy.
- Flexible lending arrangements.

Disadvantages.

- Capital needs to be recovered intact unless the co-op is set up specifically for a single project where donor funds cover part or all the capital expenditures.
- Costs of operation are often underestimated making the scheme unsustainable.
- There is a tendency to provide loans based on local politics and social status rather than on need and ability to repay.

3.5 Non-Consumer Finance

3.5.1 Utility Finance

In those countries with a high rate of electrification and a relatively high per-capita energy use, the primary opportunity for the significant use of renewable energy for the replacement of fossil fuels lies with the power utilities. With the exception of Fiji, PNG and Samoa, virtually all power generated in the Pacific is by diesel engines. In some PICs, the national utility is the largest single user of fossil fuels. Therefore using financial incentives to encourage utilities to generate with renewable energy can result in higher GHG savings than any other type of renewable energy development programme.

As government or quasi-government bodies and monopoly operators, PIC utilities typically have access to local and international finance at premium rates making it difficult to use project finance incentives, other than outright grants, to encourage utilities to switch from diesel to renewable based generation. However, indirect financial incentives/disincentives can be brought to bear. Subsidising the production of biofuels to allow the utility to purchase at a cost lower than diesel fuels is a possible approach. Removing fossil fuel subsidies, such as duty free fuel imports for utilities, is another. Providing incentive finance for IPPs that use renewable energy is a third. In general, it is not effective to focus on capital investment finance when attempting to increase utility use of renewable energy but rather to concentrate on affecting the cost of utility operations by making renewable energy a lower cost power source than diesel power using fossil fuel.

3.5.2 Commercial Finance

Commercial finance for renewable energy is the finance of businesses participating in the supply chain for renewable energy products. To stimulate the renewable energy market, finance can be focused on weak sectors in the supply and delivery chain. For example weak sectors may be suppliers of support services, local manufacturers of renewable energy equipment, importers and wholesale distributors, retail dealers or project developers. Focused financial services can be used to encourage new companies into the market, to help develop business plans, to assist in transactions, to help bring down costs for end users and to aid the provision of consumer credit. The tools available include:

- loans to companies including provision of an unsecured line of credit, loans secured by inventory and paid back with interest at the time of inventory sale, and loans with better terms specifically for renewable energy companies;
- provision of guarantees for loans and renewable energy equipment purchase to encourage the finance of renewable energy company operations in larger amounts and under better terms than conventional finance;
- contract based finance where companies or developers obtain finance based on purchase contracts from project developers;
- subsidy to the company on sales of renewable energy products where the subsidy lowers the cost of goods to businesses. Examples include duty free entry, exemption from VAT, tax relief related to the sale of renewable energy equipment and direct rebate of a portion of the cost of qualifying goods sold; and
- subsidy to companies for business development including grants for business planning, employee training, overall capacity building, public information and market development.

3.6 Financing Financiers / Encouraging the Finance Sector to enter the renewable energy finance market

To ensure a long term sustainable financing market for renewable energy it is important that the local and regional financing institutions have the capacity to be involved and are involved in the market. In many cases getting the financing organizations involved requires encouragement to overcome barriers such as lack of experience with renewable energy, prior project failures and incorrect perception of risk.

The tools available to strengthen financing organizations ability to make loans for renewable energy development include:

- risk reduction schemes that are used to lower the perceived risk by commercial lenders for loans for renewable energy systems. This can include training in risk management for renewable energy finance, interest subsidy plans to allow lenders to see a high interest rate but borrowers a lower rate, extended component warranties to ensure systems work for the whole period of the finance and capacity building programmes to improve the quality of businesses providing renewable energy equipment;
- loan guarantees that are used to guarantee loans for renewable energy equipment purchase;

- concessionary loans to micro-finance institutions to finance renewable energy systems at the local level; and
- subsidised interest for finance of renewable energy systems where the interest rate can be made lower for the purchase of renewable energy systems.

3.7 Grants

Grants can be provided for demonstrations, pilot projects, to develop the market or to buy down the cost of the technology. Grants for finance have often been used to develop "revolving funds" for renewable energy finance. Unfortunately their long term success rate has been low.

Grants often originate from private foundations, but can also be provided by international development organizations like the World Bank (WB), the ADB, the GEF, U.N agencies, bilateral funding organizations and governments.

Advantages.

- The money received is not expected to be paid back.
- Experimental and unproven technologies can be used with lowered financial risk to implementers.

Disadvantages.

- Usually a complicated process must be followed to access grant funding that may take years to complete.
- There often is a loss of flexibility in purchasing, administration, project location and system designs since donor agencies place many requirements on the implementation process.
- A large administrative cost to meet donor requirements is common.

3.8 Risk mitigation Measures

Lending institutions assign risk based on a number of factors. In general, the poorer the lending institution understands the market being financed, the higher the perceived risk for servicing that market. Finance of renewable energy systems is not common and information about actual loan risk is limited. Therefore finance institutions protect themselves by assigning renewable energy lending a high risk status since the actual risks are essentially unknown. Risk mitigation measures can provide cost effective incentives for companies to extend credit for financing non-conventional technologies where the risk is assumed to be high but in fact is simply unknown and may actually be low.

Loan Guarantees

Guarantees are a contractual promise from a financing or otherwise well-capitalised organization to provide back-up to a loan. In the case of renewable energy projects there is often little or no acceptable collateral to pledge as security against the risk of making the loan. Instead, a developer or finance institution might seek a guarantee from a large, well-capitalised organization, such as a national government, that should the project or national programme fall into arrears, the guarantor will cover the loss. This makes lending to and investing in renewable energy programmes more attractive to commercial lenders.

Guarantees are offered by multilateral development banks and national development banks. For example, the Multilateral Investment Guarantee Agency (MIGA) was organised by the World Bank in 1988 to mitigate the risks commercial lenders face in engaging a development project. MIGA fulfils this mandate and contributes to development by offering political risk insurance (guarantees) to investors and lenders, and by helping developing countries attract and retain private investment. In addition, the International Finance Corporation (IFC) has the Guaranteed Recovery of Investment Principal (GRIP) programme through which private investors are guaranteed a minimum return on investment[ii].

Some countries have instituted loan guarantee funds capitalised by donor agencies or international finance organizations. The advantages of guarantees are that they can encourage lending in a previously un-served market, can assist in leveraging other capital and can be used at many different project scales. The disadvantage is that there are often substantial costs associated with them particularly if the actual risk does turn out to be high and there are many defaults.

Partial loan guarantees

Partial loan guarantees are generally from private investment funds. They can be used to guarantee principal (capital) repayments on a loan for an initial period, typically one or two years. They can either limit risk to the lender or extend the period of the loan. They can be for different types of debt vehicles including loans. Partial loan guarantees are obtained where the acceptability of risks of the project is marginal to the lender and the partial loan guarantee can make the difference between the project going forward or not.

Export Credit Financing

Export credit financing can be used to help develop companies in a new market. The exporter of the product to be imported for a RET system is insured so that the costs due to the time-lapse between the purchase and the installation of the equipment is covered.

Political Risk insurance

This insurance is for multinationals being adversely affected by political events and/or changes in the relationship between another nation and the host country.

MIGA Multilateral Investment Guarantee Agency (a World Bank entity) provides investment guarantees against certain non-commercial risks – specifically currency transfer, expropriation, breach of contract, war and civil disturbance.

3.9 Alternative mechanisms

3.9.1 International Carbon Emissions Trading

The Clean Development Mechanism was established under the Kyoto Protocol with the aim of contributing to cost-effective mitigation of climate change and sustainable development. CDM allows countries with emission reduction targets/commitments (Annex 5.1 countries) to meet some of these reductions abroad in non Annex 5.1 countries. The CDM therefore allows developing countries to attract investment for clean energy projects.

For each metric tonne of CO_2 equivalent that a project saves, a Certified Emission Reduction (CER) certificate can be generated. Businesses, industries, or countries with reduction commitments can purchase these certificates. CERs may be used as a secure source of cash flow in the future allowing project developers to negotiate better project finance and provide increasing confidence within the finance sector. Recently the Huxentiguile Wind farm in China, owned by the Inner Mongolia Wind Company, secured finance from CERs accounting for ten percent of its capital cost, receivable as income over the first 10 years of its operation.

However, it is likely that most carbon finance will flow to larger projects and larger countries. Small projects are perceived as risky as well as having high transaction costs and cannot easily compete for private sector carbon finance even with some streamlining in the CDM process for small projects[iii]. Often small projects require as much work as large ones to make them practical for CDM processing and with small projects this can cost more than the CDM benefits.

Current emission buyers are generally government and multilateral actors with only a very limited number of private investors as yet active. These include the Prototype Carbon Fund, the Community Development Carbon Fund (CDCF) and Bio-Carbon fund (all of the World Bank); the national funds of the Netherlands (Dutch ERUPT/CERUPT) and the Netherlands Carbon Development Fund), Italy, Denmark and Finland; and funds from the International Finance Corporation and the Asian Carbon Fund.

CERs will also be eligible for sale through the EU Emissions Trading Scheme, which will provide further opportunities.

The CDCF fund will invest in projects that produce a range of sustainable development benefits, not just limited to reductions in GHG emissions, particularly if the benefits accrue to rural communities.

The processes for obtaining certification and for obtaining CDM funds is not yet well defined for many types of renewable energy projects and changes in the processes are common and require specialist knowledge to follow. Given the small project size typical of the PICs and the limited number of projects likely to be acceptable for CDM benefits, it is not practical to develop the specialist skills within the PICs and external expertise will continue to be required for the foreseeable future.

As a part of a financial incentive package, a component to finance external assistance for obtaining CDM finance can be of value to the PICs particularly for the larger scale projects likely to be undertaken by IPPs and national utility companies.

4 PROPOSED FINANCE MECHANISMS FOR THE PACIFIC ISLAND COUNTRIES

4.1 Overall Concept

There appear to be adequate financial resources available to the PICs for development of renewable energy. Finance is available from Industrialised Country development banks (e.g. France, Japan), International Venture Capital Funds (e.g. Triodos, E&Co.), Regional Development Banks (ADB), International Development Banks (World Bank), numerous Commercial Banks, National Development Banks, local investment funds (e.g. insurance funds, pension funds) and donor agencies (e.g. UNDP, UNESCO, NZAID, AUSAID, France, Japan). The problems that are faced are that:

- there is little experience with renewable energy development in the PICs that is not of a demonstration or pilot nature that has been based on grant funding. Thus there is little experience with commercial, sustainable financial mechanisms for the development of renewable energy resources;
- this lack of experience leads to an assumption of high risk for renewable energy investment and if available at all, terms for finance of renewable energy projects tend to be poor and not attractive to project developers;
- renewable energy project developers often are not skilled in the preparation of formal business plans or in financial analysis and may not be able to fulfil the requirements of financiers for realistic information regarding the probable financial performance of their project; and
- financiers generally do not have the knowledge of renewable energy technology to know whether or not the technology can perform as is indicated in project proposals and need an independent technical evaluation of the project.

Therefore the best use of GEF funds would not be for direct finance of renewable energy projects or businesses but to perform actions and services that can solve these problems and provide developers with finance at attractive terms while reducing the risk for investors to an acceptable level.

The proposed finance mechanisms are devoted to supplementing and supporting finance for renewable energy projects. No direct loans would be made, all activities would be directed toward improving the terms of finance from existing institutions thereby making existing financial processes more suitable for renewable energy finance. By concentrating on terms improvement, a high leverage rate for the GEF funding can be achieved. Additionally the goal of increasing the acceptance of renewable energy as an appropriate long term focus for existing finance organizations can occur through providing an opportunity for those organizations to gain experience with renewable energy finance at a reduced level of risk. Specific activities would include:

- loan guarantees to reduce the perceived risk for finance of renewable energy technologies. This would allow both reduced interest rates to borrowers and a higher rate of loan acceptance for finance from commercial and development banks;
- interest subsidies to reduce the interest rate seen by borrowers thereby making loans more acceptable for renewable energy projects that have marginal rates of return on investment;

- grants for assistance in the preparation of business plans, financial analysis of renewable energy projects, preparation of loan applications and preparation of project development plans to assist potential project implementers in the development of their projects to meet the requirements of financial institutions;
- capacity building for PIC finance institutions in renewable energy finance, risk management, renewable energy loan structuring and training in other aspects of finance of renewable energy technologies;
- capacity building for entrepreneurs through workshops that inform of the opportunities for renewable energy development, the technologies that are available for development and sources of finance for that development; and
- assistance to local finance institutions in the marketing of finance for renewable energy to the business community in the PICs.

4.2 Finance Programmes Appropriate for PIC Renewable Energy Development

Although all renewable energy development requires finance, providing finance for projects that face high non-financial barriers will not result in sustainable development. Therefore only those renewable energy activities that are known to be held back primarily by a lack of appropriate finance should be considered for GEF and other loan finance. Also, where there are other renewable energy finance programmes adequate to provide the basic funding requirements, the GEF funding should be used to complement and supplement that funding to increase its effectiveness and improve project sustainability. In particular, this approach can be used with the 2005 EU funded renewable energy development programme affecting Federated States of Micronesia, Marshall Islands, Nauru, Niue and Palau. The programme will include grant and possibly other types of finance for renewable energy development through the utility companies in those countries.

Analysis of the PIREP country reports indicates that five different types of financial support structures are presently suitable for delivery by a regional renewable energy finance mechanism:

- micro-finance for rural electrification. The programme would provide terms improvement supplements for finance to micro-finance agencies of government, cooperatives, NGOs, commercial banks and other rural focused small loan organizations. The programme would include loan guarantees, and interest subsidies plus grant based training for those organizations to improve skills in renewable energy loan structuring and risk management. The program would focus on those countries with a large un-electrified rural population and emphasise loans that would result in productive use of renewable energy in rural areas. Primary financiers are expected to be national development banks, commercial banks, rural businesses having large local employment (e.g. plantation owners), and rural development NGOs;
- support for finance for renewable energy based Independent Power Producer (IPP) development in those countries where there is either an existing legal and regulatory structure in place for IPPs or where the utility has shown a clear interest in developing such structures in a manner that could be financially attractive to private developers.. The programme would provide terms improvement supplements to loans and grants for technical assistance

for entrepreneurs wanting to develop renewable energy projects for feeding power to the national grids Primary financiers are expected to be international finance institutions, ADB, national development banks, local investment funds (insurance and pension funds) and venture capital funds;

- loan supplements for the capitalisation of RESCOs for rural electrification. Supplements to improve the terms of loans for system capitalisation, the provision of grants for capacity building and terms improvement supplements for three to five year loans for working capital would be made available for the finance of RESCOs in those countries where the concept has already been developed to the point where the primary barrier to expansion is finance. Primary financiers are expected to be ADB, international finance institutions, national governments and national development banks;
- loan guarantees for commercial banks on finance for solar water heaters. For those countries where the potential market for solar water heating in urban areas is large, the programme would provide loan guarantees to commercial lending institutions for loans to consumers for the purpose of installation of solar water heaters. This is intended to reduce the perceived risk of such loans and allow longer terms of finance at reasonable rates of interest for households to install solar water heaters; and
- renewable energy business development loan supplements. This programme emphasises improving the terms of capitalisation loans and providing capacity development grants to assist entrepreneurs develop businesses that support renewable energy development (excluding RESCOs which are treated separately). Included would be terms improvement for loans for the development of manufacturing of renewable energy components (e.g. solar water heaters, PV charge controllers), biofuel production (e.g. coconut oil processed as a diesel substitute for marine transport or power production), and expansion of existing renewable energy businesses.

The Melanesian countries (Fiji, Papua New Guinea Solomon Islands and Vanuatu and Fiji) have a large un-electrified rural population and a wide variety of renewable energy resources (hydro, geothermal, wind, solar, biomass, biofuel, biogas) but have a generally weak rural infrastructure and the rural economy is largely subsistence based. For those countries, the largest impact on GHG production will be through the development of IPPs that use renewable energy to deliver power to the national grid. Also, since rural labour costs are low, coconut oil as a biofuel can be an attractive renewable energy investment that can have significant impact on GHG production. Although large scale rural electrification is needed, only Fiji has demonstrated sustainable rural electrification through renewable energy by its RESCO development and demonstration projects. Small-scale private development through micro-finance agencies appears to be the best choice for the initiation of rural electrification through renewable energy in the other Melanesian countries.

For those countries that have a high rate of rural electrification and a more cash oriented rural economy: the Cook Islands, Nauru, Niue, Palau, Samoa, Tokelau, Tonga, and Tuvalu, further rural electrification cannot provide significant GHG reduction – although some expansion of PV based rural electrification in Tonga is possible. In those countries, renewable energy for grid power supplements (IPP or direct utility investment) has the greatest potential for GHG reduction. In Tonga

Tokelau and Tuvalu there may also be an opportunity for coconut based biofuel development to offset marine and power generation diesel fuel use.

The countries of Kiribati, Marshall Islands and FSM have large un-electrified rural populations that are somewhat engaged in the cash economy and are characterised by numerous small islands, high use of fossil fuel for shipping and high cost of access to rural islands. For those countries, development of rural electrification through the RESCO concept appears appropriate, particularly in Kiribati and the Marshall Islands where RESCO type projects have been operating for some time.

Table 4-1 summarises the types of financial support proposed for renewable energy development in the 15 countries affected by PIREP. Country participation is only indicative and would be determined at the time of project implementation.

Table 4-1 Types of finance expected to be used in each PIC

Country	Micro-finance for rural electrification	Finance for IPP development	Finance of RESCOs for rural electrification	Loan guarantees for Commercial finance for solar water heaters	Renewable Energy Business Development loans
Cook Islands		✓			
FSM	✓		✓		✓
Fiji	✓	✓	✓	✓	✓
Kiribati	✓		✓		
Marshall islands	✓		✓	✓	✓
Nauru				✓	
Niue				✓	
Palau		✓		✓	
PNG	✓	✓		✓	✓
Samoa		✓		✓	✓
Solomon Islands	✓				✓
Tokelau					✓
Tonga	✓		✓	✓	✓
Tuvalu				✓	✓
Vanuatu	✓			✓	✓

4.3 Proposed Programme Structure

A Pacific Island Renewable Energy Fund is proposed to be considered and studied further that would provide financing terms improvement support for renewable energy in all fifteen island countries. It would consist of a single fund that would be managed overall by a commercial bank or a regional organization who would be responsible for working with the PICs to determine the types of finance to be supported in each country and to develop overall policy for the fund. Financial management would be contracted to a professional financial management organization who would be responsible for carrying out the Fund policy and establishing the necessary structures needed to perform risk assessments, determine worthiness of applicants, structure finance supplement contracts, arrange for disbursement of funds, and ensure that all

financial activities are carried out in a manner consistent with good professional practice.

The aim is that the funding made available would supplement, complement and leverage primary finance from existing local, regional and international finance institutions. Development of new financial structures within the PICs is not proposed.

4.3.1 Programme Manager

The programme manager would be a commercial bank (such as Development Banks, ANZ, Bank of Hawaii) or a regional organization (e.g. SPREP, SOPAC, SPC, a regional NGO) with existing and detailed knowledge of the development context of the PICs, with existing structures for the development and management of large scale regional programmes and established access to high levels of government in the PICs. The responsibilities of the programme manager would include:

- development of detailed policies and structures for the programme. This would include allocation of resources, establishment of overall fund management procedures, establishing criteria for access to the fund by PICs, hiring of the fund manager, development of non-financial support structures (e.g. capacity building activities associated with the provision of financial services) and all other activities relating to the administration of the programme;
- designate which countries would have access to which of the five types of financial structures and establish specific criteria for that access. This would be determined by development of criteria for each type of financial structure that would ensure that the structure would not be used in countries where non-financial barriers to the type of renewable energy development being financed would prevent the finance from significantly accelerating renewable energy development. For example, if would not be effective use of the fund to finance terms improvements for loans to RESCOs in countries where there have been no prior successful trials, where there is no supporting legislation, no appropriate policies or where there is no capacity for their long term support;
- negotiate with governments to provide incentives for renewable energy business development (tax holidays, duty free imports, subsidy incentives, etc.);
- negotiate with utilities on behalf of renewable energy IPP project applicants to obtain a power purchase price of at least 80% of the utility's marginal cost of power production;
- work with other multilateral and bilateral finance institutions and governments to develop finance packages for renewable energy projects that result in larger or more numerous projects that have more overall impact than could be financed by the institution alone;
- participate in Regional Planning Committees that include renewable energy development such as the regional Energy Working Group (EWG); and
- develop and manage capacity building programmes that include formal training development for both finance institutions and PIC entrepreneurs, workshops focused on renewable energy development and finance and assist local training institutions in delivering renewable energy business development programmes.

During the initial three to four years, professional staff specifically to carry out the programme management functions would be present. In the later years of the

programme after the programme is running at full capacity, the regional organization should be able to carry on the remaining tasks without specialist staff.

4.3.2 Regional Fund Manager

The Regional Fund Manager would be a professional fund management firm hired by the Programme Manager through an international tender process. The responsibility of the Regional Fund Manager would be to:

- keep accounts of fund activities at the regional and at the PIC level;
- establish specific procedures for accessing each of the five types of finance including procedures for application, for assessing applicant's likelihood of complying with fund terms, disbursement of finance supplements and general operations of the fund;
- maintain a close working relationship with international, regional and local finance organizations to ensure optimal use of the fund to lower financial barriers to renewable energy finance by those organizations;
- advise the Programme Manager in developing policies and procedures that will affect the operations of the Regional Fund Manager; and
- to oversee the closing out of the programme and ensure that exit policies and procedures are properly followed.

4.4 Grant funding

Grant funding in modest amounts would be available from the Fund for assistance in project financial design and development, capacity building for financial institutions and business development training for RESCOs and other capacity building activities as deemed appropriate by the Project Manager that are not available from other sources.

The Programme Manager will actively seek additional grant funding for clients from bilateral and multilateral donors to support of the activities of the Fund.

4.5 Project Size

A five-year project with access to US$7.9 million in funding is proposed. Of this amount 20% is allocated for overhead and fund management costs, 18% for capacity building grant funds, and the remainder for terms improvement activities including interest subsidies, loan guarantees and extensions to a longer term of finance.

Although the programme is designated as having a five year life, the effects would carry on much longer since the loans being supported would extend beyond the five year term of the project. Therefore the process used for the terms extensions would need to be one that can be applied at the front of the loan with a one time payment, e.g. as an interest reduction payment. Otherwise the cost of long term disbursements of funds for terms improvement would be excessive and would require retention of a fund manager for the whole term of all outstanding loans.

At the end of the programme, any surplus funds could be returned to GEF or disbursed to national development banks under terms requiring their use for renewable energy projects.

With an average estimated leverage of 5.6 to 1 (for every $1 applied as terms improvement from the Fund, new finance of $5.6 would become available), the

provision of US$7.9 million would result in new finance from various sources of $44.5 million exclusively for the development of renewable energy.

An indicative allocation of funds is:

Type	Mode	Fund input (millions USD)	Expected Leverage Ratio	Leveraged Finance
IPP finance	Loan guarantees, interest rate reduction, longer loan term, negotiate with utility	$2.0	10:1	$20.0
RESCO finance	Capacity building, improved terms for system capital loans, improved terms for working capital loans	$0.5	20:1	$10.0
SWH finance	Loan guarantees	$0.8	10:1	$8.0
Renewable Business Finance	Improved terms of finance, technical assistance, capacity building	$1.0	5:1	$5.0
Rural micro finance	Loan guarantees, interest rate reduction, longer loan terms	$0.5	3:1	$1.5
Project Management		$0.60		
Fund Management		$0.96		
Capacity building grant programme		$1.50		
Total Programme Cost		$7.9	5.6:1	$44.5

5 ANNEXES

5.1 Overview of financing entities active in the region

There are a number of financing organizations active in the region, which can be categorised into a number of different groups. Each type of financing entity is likely to provide a different range of financing options. An overview to available financing is given in the table below. Further information regarding each of the organizations in the region is given in the following sections including an indication of their evaluation guidelines and investment criteria. More detail on some of the country organizations is provided in the PIREP country reports.

Table A1: Matrix of Financing Instruments[IV]

Financial Institution	Market-based Loans	Soft Loans	Grants	Equity investments	Guarantees	Technical Assistance	Other
Multilateral Development Banks	X	X		X	X	X	
Bilateral Aid	X	X	X			X	
Multilateral Aid			X			X	
Funds / Foundations	X	X	X	X			
Green Investment				X			X
National Development Funds	X	X			X	X	
Commercial Banks	X						
Venture Capital Funds	X			X			

5.1 Multilateral Development Organizations

The goals of most Multilateral Development Organizations are to combat poverty, improve water and food supplies, improve access to electricity, provide education opportunities, improve health services, develop infrastructure, develop job opportunities, and improve the standard of living. They are likely to aim their financing at the development of infrastructure components such as providing training (capacity building), regional marketing, and small business development that will help a programme achieve "sustainability" – e.g. working PV systems providing electricity to the recipients for years to come.

Financing ranges from large loans to the national governments of developing countries to small consultancies and technical assistance grants[V]. The interest rates on the loans will often be below market levels with grace periods ranging from three to ten years.

5.1.1 Global Environment Facility (GEF)

In addition to meeting specific environmental goals, projects must meet several clear guidelines to be considered for GEF funding, including: i) reflecting national or regional priorities and demonstrating the support of the country or countries involved, and ii) improving the global environment or advancing the prospect of reducing risks to its degradation. In addition, host countries need to have ratified any relevant international treaties (such as the UNFCCC) and must be eligible to borrow from the World Bank or receive technical assistance grants from UNDP.

5.1.2 The World Bank Group

The World Bank Group has three MDB subsidiaries. One, the International Bank for Reconstruction and Development (IBRD), provides loans to developing countries at more favourable terms than would be available from commercial lending organizations. For example, the loan terms for IBRD loans generally include 15-20 year repayment periods with three-five year grace periods during which no interest is charged. In 2002, IBRD provided loans totalling 11.5 USD billion in support of 96 projects in 40 countries[vi]. Another component of the World Bank Group, the International Development Association (IDA), supports the reduction of poverty worldwide through loans, guarantees, and non-lending services, including analytical, policy, and advisory services. The International Finance Corporation (IFC) is a member of the World Bank Group that provides loans, equity finance and quasi-equity to private-sector projects in developing countries. It also offers financial risk management products and intermediary finance.

5.1.3 Asian Development Bank (ADB)

The ADB covers most of the PICs covered by PIREP, however Niue and Tokelau are not members.

The ADB is currently preparing its Pacific Strategy 2005-2009 and has consulted with Pacific developing member country governments, regional organizations, civil society, the private sector, academics and donors – mostly at the regional level – on the strategy. The draft strategy maps out possible future directions for ADB's environmental assistance to the region. These are grouped according to four intervention levels. Renewable energy is included at the sub-national level, at the national level within development planning and at the regional level.

Renewable Energy and Efficiency Program for the Pacific (REEP)

REEP is an ADB technical assistance project funded by Denmark for East Timor and PIC member countries with a budget of US$0.6 million over two years. It will operate in 2004 and 2005. It aims at developing a demand-driven and private sector based market for renewable energy and energy efficiency in two countries, Fiji and Samoa, targeting the rural and remote communities. In this regard, the project will collect lessons learned from past projects, provide an action plan for policy development and develop an action plan for the adjustment or implementation of an adapted legal framework specific to renewable energies and energy efficiency. It will also develop financing mechanisms focused on private sector companies and end users.

5.1.4 Promotion of Renewable Energy, Energy Efficiency and GHG Abatement (PREGA)

An ADB programme funded by the Netherlands, PREGA is a multi-year programme intended to develop renewable energy and energy efficiency programs for future funding by finance agencies such as the ADB. PREGA covers all the ADB member countries but only Samoa is directly targeted in the Pacific for initial action. Activities to date include regional workshops and the development of country papers for the target countries.

5.1.5 European Commission (EC)

The EC channels its development financing through the EuropeAid Co-operation Office, the mission of which is to implement the external aid instruments of the European Commission. EuropeAid is funded by the European Community budget and the European Development Fund and provides external aid through either contracts to provide services, supplies or works to beneficiary countries, or through grants to non-profit organizations. EuropeAid releases calls for proposals to which programme planners can apply for funding[vii]. The European Investment Bank (EIB) then implements the financial component of agreements concluded under European development aid and co-operation policies[viii].

The EU has funded a number of projects in the PICs including PV systems in Kiribati, Tonga, PNG, Fiji and Tuvalu.

EU project to support five ACP countries.

The EU will finance a regional development project at the level of five new ACP Pacific Islands Countries, namely Niue, Marshall Islands, Federated States of Micronesia, Palau and Nauru. These countries seem to be interested in including RE deployment in their respective National Indicative Programs that provides the framework for EU co-operation for the next few years. The financing proposal is supposed to be finalised by the end of 2005. The implementation of this €11.4 million initiative is expected to end in 2010. The program will build on the previous experience with EU funded programmes, and the persons in charge are well aware regarding (i) the need to provide reliable equipment's tailored to the need of the communities and based on proven technologies; (ii) the absolute necessity of a model that provides sustainability for O&M and (iii) the vital role of local companies, especially utilities, in this model. The EU budget is designed so as most of the funds will be made available to each country for purchasing renewable energy equipment.

5.1.6 United Nations Development Programme (UNDP)

UNDP has provided funding for technical and management training in Kiribati, funding for PV based water pumping in Kiribati and has provided numerous small renewable energy projects, technical consultancies and capacity building efforts for the PICs.

5.1.7 Economic and Social Commission for Asia and the Pacific (ESCAP)

ESCAP does not directly fund projects but managed the Pacific Energy Development Programme and has provided numerous consultancies and studies relating to renewable energy in the Pacific.

5.2 Bilateral Aid

The goals of bilateral lending agencies are determined by the legislation and administrations within each country. In addition to providing funding through their own national funds, the major developed nations also coordinate their development financing through the Organization for Economic Co-Operation and Development (OECD), which provides its member nations with a forum called the Development Assistance Committee (DAC). The goal of the DAC is to increase the effectiveness of the sustainable development work of OECD member nations. The DAC has produced the following guidelines for awarding development funding, applicable for most bilateral agencies:

- first, projects should be relevant to the priorities and policies of the target group, recipient, and donor;
- second, projects should effectively achieve the objectives they were designed to achieve;
- third, projects should be designed in such a way as to create clear benefits in proportion with the resources needed to carry out the project. This generally requires comparing alternative approaches to achieving the same outputs, to see whether the most efficient process has been adopted;and
- fourth, projects should evaluate both the intended and potential unintended consequences of the project and the sustainability of the project's benefits;

In addition to coordinating development efforts through the DAC, the OECD Technical Assistance Committee (TAC) contributes to development projects by providing logistical and technical support.

Bilateral financing is generally open only to the national governments of developing countries. Bilateral organizations working in the Pacific include the following.

- JICA - For example JICA funded PV equipment and training in Kiribati and in Vanuatu.
- GTZ – GTZ has provided funding for renewable energy projects in PNG and the Solomon Islands.
- AusAID – AusAID has provided funding for community development services in PNG, rural electrification in Tonga and for infrastructure in Nauru.
- USAID – USAID provided grants for PV and other renewable technologies in Fiji, Palau, FSM, Marshall Islands and Samoa.
- NZAID – NZAID have provided funding for PV on Tokelau and Tonga
- AFD – The French government has provided funds to the Cook Islands, New Caledonia and French Polynesia for PV and grants for PV in Fiji, Tonga, Tuvalu, Marshall Islands and FSM.
- Pacific Rural Renewable Energy France-Australia Common Endeavour (PREFACE) programme provided funding for PV in Vanuatu, Tonga and the Marshall Islands plus wind power in the Cook Islands.

5.3 Funds /Foundations/Trusts

Foundations, charities, and private funds set up to sponsor development projects often provide capital in the form of grants or soft loans.

5.3.1 United Nations Foundation

The United Nations Foundation primarily funds climate change mitigation and environmental work.

5.3.2 Vanuatu Biodiversity Conservation Trust

The Vanuatu Biodiversity Conservation Trust is a first of its kind in Vanuatu and in the Pacific Region. The Trustee will manage the Trust Fund. The Trustee will answer to a Board of Appointees who will act as an independent body to monitor the performance of the nominated Trustee, which is Pacific International Trust Company Ltd. (PITCO). The appointees will have the power to remove and replace the Trustee. This is an important factor for the security of the Trust Fund, as it de-politicises it and reduces the risk of any transferral of the Trust or of its funds for use other than the stated purpose. It also gives the Fund credibility and security when seeking donations by showing that there is an independent "watch dog" body.

The appointees will not be involved in advising the Trustee on use of the funds relating to the purpose of the Trust Fund. A Technical Advisory Board will be established to advise the Trustees on matters relating to the running of the Trust Fund with respect to individual projects and use of funds for the retention of forests in Vanuatu and related biological conservation. The Technical Advisory Board will be made up of representatives from Department of Forests, Environment Unit, Malvatumauri National Council of Chiefs, Vanuatu Cultural Centre and from the Trustee.

The Trust Fund already has its first project that is the funding of the lease for a National Forest Reserve, the Erromango Kauri Reserve, 3202 ha of forest of regional importance on the Island of Erromango.

Sarakata Special Reserve Fund

The Sarakata Special Reserve Fund is established in Vanuatu and is financed from the income of a Japanese-funded, UNELCO-operated, hydroelectric system near Luganvuille. It provides funds specifically for RETs for small-scale rural electrification in remote communities of Vanuatu.

Solar Electric Light Fund (SELF), USA

SELF provides assistance, training, financing and installation of PV and has helped fund PV projects in the Solomon Islands and has a further project planned for solar refrigerators in the Solomon Islands.

Triodos Renewable Energy for Development Fund

Triodos is a Netherlands based bank specializing in loans and equity capital finance focusing for projects that mitigate climate change and provide environmental benefits. Triodos is not currently active in the Pacific region but it is open to expansion. It was a major partner in the management of the now closed Solar Development Capital fund that provided loans and venture capital specifically for solar projects around the world,

E&Co

E&Co is a venture capital and loan fund that finances sustainable energy enterprises in developing countries though not presently active in the region.

Shell Foundation

The Shell Foundation works with local partners in support of sustainable energy projects. Though it has financed renewable energy activities in Asia, it is not currently active in the region.

5.4 Review of RE Financing Schemes Experiences and Lessons Learned in other countries

This section summarises the experiences from a number of renewable energy financing schemes in SIDS and developing countries around the world. For each scheme the objectives are listed and a description of implementation and funding flows is given. A critical review is given of the success and lessons learned from each programme. Key lessons can be derived from these programmes in the design of an appropriate mechanism for the PICs. These lessons are summarised below.

- Any mechanism must be flexible enough to address all stakeholders, project technologies, scales and different circumstances in each country.
- Investment structures should be kept as simple as possible and where possible avoid bureaucracy and complicated systems. It is difficult to close deals between multiple partners.
- Loan sizes should be kept appropriate to the market.
- Finance should be focussed at appropriate level for that market and technology.
- Good management of the mechanism is very important.
- Co-operate with established local institutions and funds.
- Take into account time to persuade local financial institutions to become involved.
- Ensure finance is available at all levels of the market.
- Take account of any legal complexities during the design of the mechanism.
- Ensure any competitive fund tendering process ensures that projects/programmes are sustainable beyond the initial financing and are market led, not supply led.
- Support from local government agencies is important.
- Capacity building must be provided simultaneously to achieve the best results.
- Use existing national or internationally available technical standards where possible.

5.4.1 Photovoltaic Market Transformation Initiative (PVMTI)

The Photovoltaic Market Transformation Initiative (PVMTI) is an initiative of the International Finance Corporation and the Global Environment Facility. It is a single financing facility for photovoltaics with a variety of financial instruments including combinations of technical assistance and loan financing as well as guarantees and equity.

PVMTI is a strategic intervention to accelerate the sustainable commercialisation and financial viability of PV technology in the developing world, especially for rural electrification. The specific focus is to stimulate PV business activities in India, Kenya and Morocco and to demonstrate that quasi-commercial financing can accelerate sustainable commercialisation and financial viability in the developing world.

This is being achieved through:

- providing finance for commercial business ventures to install SHS according to individual business plans competitively selected by the project;
- financing business plans with commercial sub-loans at below-market terms or with partial guarantees or equity instruments;
- pilot implementation through an External Management Team which administers financing to a large number of small sub-projects; and
- provision of technical assistance (through the External Management Team) to SHS business on planning, financing operations and technology.

An important aspect of PVMTI is that it is concessional finance, not a grant, thus GEF investment is eventually returned through repayment of the concessional loans.

Implementation and flow of funds

The project is administered by the IFC through an External Management Team (EMT). The EMT is responsible for attracting potential investee companies, for negotiating investments on behalf of IFC and for monitoring investment performance over the life of the project.

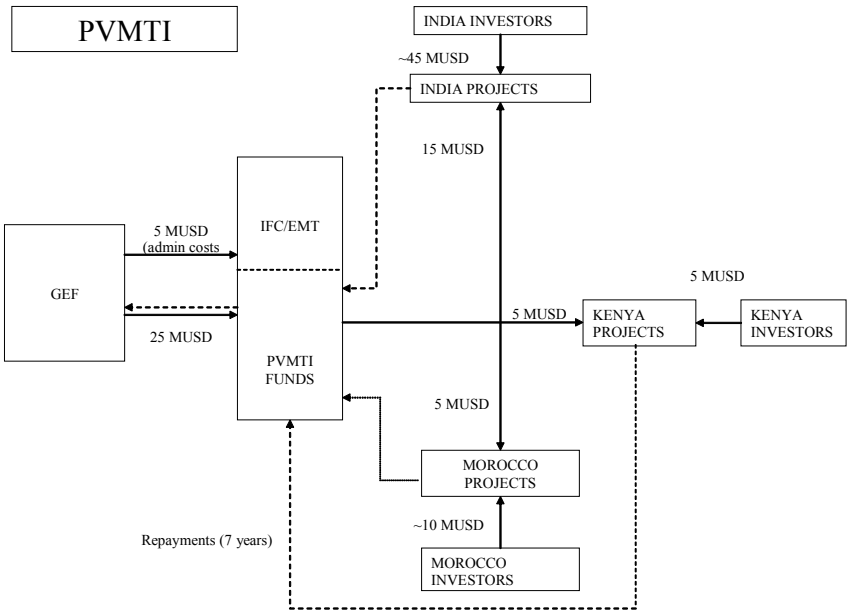
PVMTI makes selected investments in private sector PV market development projects received in response to competitive solicitation, providing them with appropriately structured concessional financing in the range of $0.5-5 million. Concessional funds maybe provided as:

- Debt (senior or subordinated)
- Partial risk guarantees; or
- Equity (to a lesser extent).

Approximately 10% of each investment is in the form of a grant for training, equipment testing etc.

Projects are selected based on their strategic impact in overcoming the barriers and transforming the PV market. In terms of reducing and overcoming barriers to building PV markets, the private sector is considered the best agent to catalyse investment and business activity, and PVMTI's solicitation and selection approach provides a competitive element that is expected to maximise financial leverage and deliver sustainable and replicable near-commercial projects by providing successful and replicable examples of good business and technical practices. PVMTI investments seek to prove the viability of a number of different business models, ranging from partnerships with industrial players, leverage of an existing distribution network to joint ventures between PV companies and finance institutions to provide credit for solar customers. In some cases, PVMTI is also providing financial backing to some new applications of PV technology.

In order to establish sustainable businesses beyond the end of the PVMTI programme, investee companies have to source co-financing from sponsors and other financial institutions to achieve the following leverage targets on PVMTI funds: India 3 to 1; Morocco: 2 to 1; and Kenya: 1 to 1.



Lessons learned

USD 20+m has been committed and the project is supporting thirteen projects/business models, although not all of these have commenced. The progress has been slower than expected and some of the key lessons from the programme have been the:

- country unique business environment – each country is unique and one solution is not applicable to all;
- flexible investment – flexible PVMTI investment terms facilitate optimal structuring of projects;
- good management – a strong and experienced management team is vital component of the business plan;
- difficulties closing deals between many partners – Co-ordination and mediation between many project sponsors can take a long time and cause complications;
- simplicity – Investment structures should be kept simple
- loan sizes must be appropriate for size of market – for example in Kenya organizations needed USD$500,000 to be eligible and this was difficult for many in an uncertain economic climate; and
- use of existing standards - To ensure the technical quality, all PV systems supplied under PVMTI must comply with a set of technical standards referred to as the "PVMTI Technical Guidelines". Rather than seek to create new technical norms, the IFC/EMT adopted existing state of the art standards, protocols and procedures for systems and components, for qualification of Solar Home Systems. This approach is intended to contribute to global acceptance of universal standards and avoids adding to the multitude of international standards for PV rural electrification applications, most of which have never been effectively applied.

Detractors of the programme criticise the procedure for being too bureaucratic and time consuming as much of the project preparation and closure took longer than anticipated. The programme has been extended by two years to complete the final investments and allow sufficient repayment periods.

5.4.2 Caribbean Renewable Energy Facility

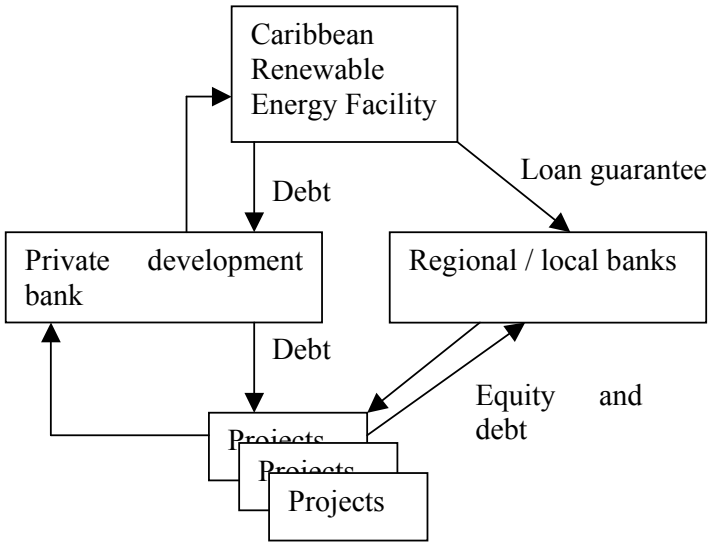
The Caribbean Renewable Energy Facility (CREF) has been established by the CARICOM Secretariat through its execution of the Caribbean Renewable Energy Development Programme (CREDP). The facility is a debt facility in the form of a line of credit from a development finance institution to an intermediary private development bank of a commercial bank with regional operations in the Caribbean. The intermediary financial institution on-lends to a portfolio of private sector renewable energy projects. The projects are screened under the CREDP. The lending policies are based on those of the Caribbean Development Bank as a good example of lending in the region. This will also ensure that the intermediary financial institutions earn sufficiently from the interest rates charged.

The concept is that the projects will range in different sizes, technical and geographical diversity but will fall under an umbrella agreement allowing transaction costs to be spread over the whole portfolio of projects. The debt facility is expected to leverage additional finance from regional and local commercial banks and equity finance, although a number of barriers have been identified to equity and debt investment. These include high equity requirements, high collateral requirements (up to 200 percent) and a lack of guarantees and appropriately prepared projects. Three strategies are proposed to address these barriers:

- help to prepare bankable projects including templates for PPAs, project finance models etc. with the aim to add value to the deal structuring process whilst mitigating real and perceived risks;
- design of a special commercial loan guarantee programme to be backed up by a loss reserve fund; and
- leverage existing guarantee production.

In addition a Technical Assistance Facility has been established which will provide technical advice, undertake deal initiation and marketing activities.

There are no lessons yet available from the CREF.



5.4.3 Grameen Shakti Microfinancing

Grameen Shakti (GS), formed in 1996, is a not-for-profit rural power company supplying renewable energy to un-electrified villages in Bangladesh. It is a sister organization of the Grameen Bank which has successfully established micro-finance for some of the poorest people in Bangladesh.

GS focuses on supply, marketing, sales, testing and development of renewable energy systems such as solar PV, biogas and wind turbines.

GS aims to:

- popularise and deliver renewable energy to un-electrified rural households;
- market solar, biogas and wind energy on a commercial basis, focusing on rural areas, particularly the borrowers of Grameen Bank;
- provide services that alleviate poverty and protect the environment through applied research and development of renewable energy-based technologies;
- undertake a project to progressively manufacture and market efficient and affordable household-based photovoltaic systems;
- implement projects to generate electricity from wind in the coastal areas and off-shore islands and operate small hydro electric plants in the hilly area of Bangladesh;
- develop and implement special credit, savings, and investment programs for generation, storage and utilization of renewable energy for the benefit of the rural people;
- test new technologies to provide more cost-effective energy services at affordable prices to un-served and under served people; and

(a) to provide capital, technology and management services to renewable energy ventures.

Implementation and Flow of Funds

It planned to install 5000 solar home systems within three years and not only to supply renewable energy services, but also to create employment and income-generating opportunities in rural Bangladesh. Shakti opened 20 branches in rural Bangladesh.

Grameen Shakti (GS) has introduced two approaches for providing customer credit facilities:

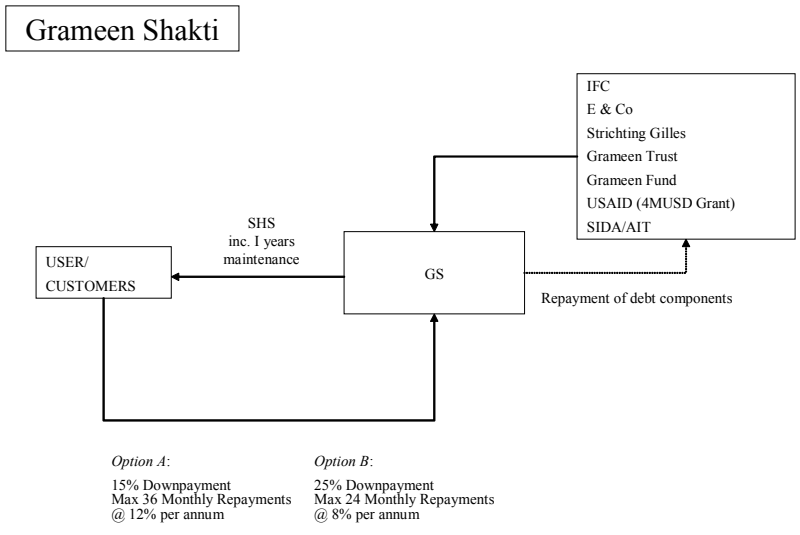
- 15% down payment, remainder (85%) repayable within 36 months at 12% per annum; and
- 25% down payment, remainder repayable within two years at 8% p.a.

For existing Grameen Bank customers, the loan is given under the bank's leasing programme and repayments are made weekly, otherwise repayments are monthly.

One year's maintenance is included in the SHS system cost (of between USD$300 to US$600).

GS also plans to open some special branches through which it will research on marketing policy. This network allows Grameen Shakti to quickly disseminate and commercialise any improvement in the technology. GS arranges meetings for villagers at local centres (e.g. schools and colleges, at bazaars or at villager's homes) to demonstrate the functions and explain the benefits of SHSs. Information materials (posters and leaflets) are also disseminated.

Training, both of GS technical and managerial staff and of local sales and after sales staff (retailer/technicians) is also an important factor.



Lessons Learned

The association with an established stakeholder, the Grameen Bank, has both advantages and disadvantages:

- Grameen Bank has over 1100 branches and 2.3 million customers and a good reputation nationwide, so GS should be fairly well-received amongst potential user groups; and
- the network of branches provides good technical support which, in addition to the user training, should help to eliminate poor performance problems. It also provides a good feedback loop for addressing any problems that arise.

However:

- GS loans are likely to be larger than those disbursed by Grameen Bank itself, so recovery aspects become more questionable; and
- the normal Grameen solidarity group approach is not being implemented by GS, which again may affect loan recovery.

5.4.4 Shell Foundation's Energise

Energise was launched in 2000 via a portfolio of ad-hoc projects. The approach is targeted towards establishing strategic partnerships with selected local stakeholders (some operating on a commercial or quasi-commercial basis). Two examples are given below: The Uganda Energy Fund and Empowerment through Energy Fund in South Africa (ETEF). Other projects supported include the Decentralised Rural Power Production from Biomass in India. Through this project, Decentralised Energy Systems India Ltd has established three biomass gasification based power plants that generate electricity which is sold for pumping water or used as a power source by village micro-enterprises.

The Shell Foundation is also supporting the Establishment of a Consumer Financing Programme for Solar Photovoltaic Systems in Southern India. Together with the United Nations Environment Programme, assistance is being provided to develop the lending portfolios of Canara and Syndicate Banks to finance solar home systems in poorly serviced areas of Karnataka and Kerala States.

In Africa Energise is working to improve Rural Solar Telecom Services in Uganda. Together with local and international partners, the foundation is supporting South African telecom company MTN and the Grameen Foundation to identify low cost and reliable energy systems that act as a power source for battery operated phones in off-grid areas of the country. In Burkina Faso they are working with the United Nations Development Programme to enhance the business model for Multifunctional Platforms – which are diesel-run energy systems that provide power for a variety of local micro-enterprises.

Lessons learned

Initially a reactive approach to grant making was adopted and hence the first projects were largely based on proposals submitted to the Foundation by established not-for-profit organizations and university-based policy research institutions. Most of this first generation of projects are now complete and have produced some valuable knowledge. However, nearly all failed to deliver benefits to their target audiences that were sustainable beyond the life of the project, nor provide any basis for replication or roll-out.

For the second generation of projects in 2002, a formal request for proposals was initiated against clearly defined criteria for the type of proposals looking to be supported. While many proposals from not-for-profit organizations were received, the majority of these had no clear approach to achieving financial sustainability, or were based on single-technology solutions that were supply driven rather than market-led. It was therefore concluded that the request for proposals process, while transparent, is an inefficient way to identify innovative, business-based and market led proposals that deliver measurable and sustainable benefits to the target audience of under served communities, households and SMEs. Therefore the approach was changed to working with established partners as described below.

5.4.5 Uganda Energy fund

The Uganda Energy Fund provides lease finance for the purchase of energy equipment plus advice, technical support and business development services to Small and Medium Enterprises SMEs in the pro-poor energy sector. Through matched funding, the Shell Foundation and Dfcu Leasing have created a new US$4 million fund that will provide finance on a commercial basis to the following SMEs in Uganda:

- SMEs that manufacture, distribute and or sell energy services/products;
- SMEs that manufacture, distribute, and/or sell energy efficiency services/products; and
- SMEs that can directly limit the adverse effects to the environment.

Co-operatives, NGOs or institutional partners may be eligible if they can demonstrate how modern energy products or services will be used or provided on a financially viable basis. The Uganda Energy Fund defines modern energy services as off-grid electrification schemes, all types of liquid, gaseous and solid fuels and renewable energy.

Leasing provides particular benefits to SMEs, as it allows businesses with limited capital and credit history to access medium-term finance in ways suited to their operations.

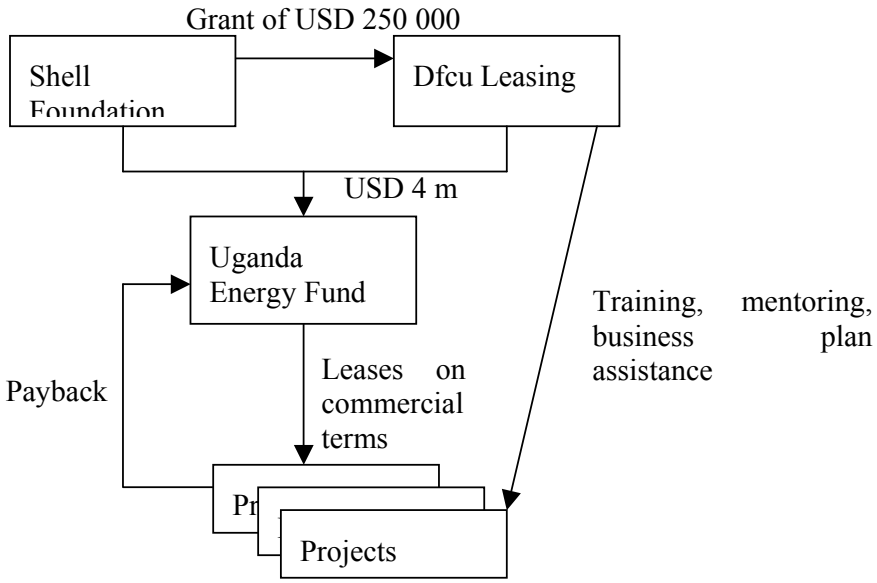
The Shell Foundation has also provided a grant of US$250,000 to Dfcu Leasing that supports the provision of the following services to SMEs:

- business skills training;
- assistance in preparing financially viable business plans;
- co-funding with the costs of securing necessary consents; and
- providing mentoring support to lessees .

As of the end of June 2003, Dfcu Leasing has approved 25 leases totalling US$1.3m. The Fund has supported a portfolio of projects that include:

- the provision of stoves, generators and solar lighting to schools, which has enabled the Madera Girls' Secondary School in Soroti to extend lessons after dark for the first time;
- the provision of solar driers to fruit farmers in Kayunga and Muko that has enabled them to increase ten-fold the production of dried mango and pineapple;

- the provision of a generator to Lweza Clays that has enabled this SME to replace the use of firewood, reduce the time taken to fire the kiln from 10 days to 3-4 days, reduce electricity bills and improve product quality; and
- Elgon Village Bank taking a US$41,000 lease to purchase solar home systems that are now in use in schools, clinics and homes in Sironko.



5.4.6 Empowerment through Energy Fund, South Africa

Launched in June 2003, the US$6.3 million Empowerment Through Energy Fund (ETEF) is a partnership between Shell Foundation, ABSA Bank, Industrial Development Corporation, RAPS Finance and Shell Southern Africa to provide real industry expertise. The vision of the Fund is that the successful provision of services and capital to energy enterprises will lead to the delivery of modern energy services in a sustainable manner through the empowerment of historically disadvantaged individuals in the energy SME sector. These services will then enable substantial numbers of households, businesses and communities to achieve productivity, quality of life and environmental benefits.

Only SMEs that are compliant with the government's Black Economic Empowerment (BEE) guidelines are eligible for support. The Fund provides both technical support, assisting with the preparation of business plans, as well as risk capital suited to the needs of the individual enterprise. It also invests capital, skills and knowledge in viable BEE SMEs to be a pioneering force in developing the BEE SME energy sector in South Africa.

The Fund defines modern energy services as off-grid electrification schemes, all types of liquid, gaseous and solid fuels and renewable energy. BEE SMEs that want to acquire modern energy services to increase their productivity and/or manufacture, distribute or sell modern energy products and services are all eligible.

5.4.7 Sri Lanka Energy Service Delivery

This project encouraged participation of the private sector, NGOs and co-operatives in the provision of on-grid and off-grid energy services. It aimed to strengthen the public and private institutional capacity to deliver energy services through renewable energy technologies and demand-side management (DSM).

Its specific components were:

- a private sector renewable energy fund (energy services delivery credit programme) to support pre-grid, PV electrification, mini-hydro schemes and other renewable energy sources. Credit was channelled through participating credit institutions (PCI) and co-operatives (approx. US$49 million);
- a pilot grid-connected wind farm (3MW) (approx. US$3.8 million); and
- technical assistance for the use of renewable energy in residential and commercial sectors, for the Ceylon Electricity Board (CEB) to prepare a DSM action plan and a National Renewable Energy Strategy, for CEB to facilitate small private power investments and pre-electrification, and for management of the renewable energy fund (US$2.6 million).

Implementation and Flow of Funds

Ministry of Finance on-lends to eligible Participating Credit Institutions (PCI). PCIs may be private commercial banks, development finance institutions or other private financial institutions. They must be approved by Central Bank of Sri Lanka and the Ministry of Finance and Planning before entering participation agreement with GOSL. Participation agreement specifies PCIs responsibilities with respect to project promotion, appraisal, supervision, repayment terms and compliance with laws/regulations.

PCIs complement financing and provide sub-loans to private companies or project developers who on-lend to the end user.

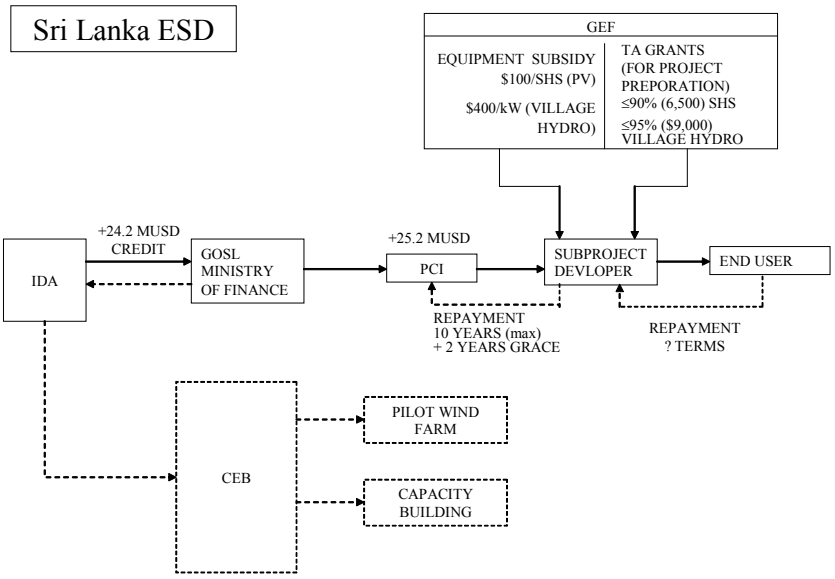
The initial target was for the installation of 30,000 solar home systems. US$5 million dollars was allocated for the pre-electrification by solar home systems or by village hydro systems. These funds were made available to PCIs to on-lend to private enterprises, NGOs and co-operatives to provide the systems to villages. In addition to the available micro credit there was a GEF grant component of US$100 per PV SHS with a module rating not less than 30 watts.

GEF funds were also available for the following support activities:

- Off-grid project promotion. The administration unit had funds to undertake promotions that would increase awareness amongst potential customers;
- Solar Home System design verification. The PCIs could hire consultants to verify SHS designs were in accordance with IDA-approved specifications and that the systems were installed properly; and
- Consumer Education and Protection Facility. This will allow the administration unit to investigate complaints by consumers against dealers.

Initial uptake was slow until the Solar Power and Light Company (SPLC) signed an agreement with the Sarvodaya Economic Enterprises Development Services (commonly known as SEEDS) where SEEDS would provide credit for all sales done by SPLC.

The Directors of SPLC actively sought out Shell Renewables and arranged for a takeover. This provided capital investment of over US$2m dollar to develop the sales, service and product delivery infrastructure around the island. The company went from staff of 20 (pre-Shell) to almost 400 in two years and created the ability to reach most of the remote SHS customers around the island. This operation was supported by the establishment of 16 solar centres around the Island.



Lessons Learned

At the project mid-term review the target was that 6000 SHS would have been installed; the actual figure was only 723. The mid-term review found that the poor performance of the SHS component of the credit programme was a result of a number of technical and implementation issues. In summary these were:

- SHS sub loans were too small for the typical PCIs to justify the costs involved in loan processing. Hence there had been no active promotion by the PCIs to encourage the uptake of any SHS loans. The PCIs were not experienced in dealing with small rural borrowers and therefore viewed them as high risk. Therefore they were not using the money that was available; and
- the SHS companies were also not experienced at being "banks". In general they did not want to get involved with obtaining the funds from the PCIs and be involved with providing loans directly to the system owners. If companies did look at this option they found that the cost involved in securing the loans and processing micro-loans was too high. Also at the time the solar companies did not have a vast dealer network in the rural regions to promote loans nor easily service the loan applications.

Without the infrastructure to provide loans to the potential system owners in the rural areas, the potential owners were unable to obtain affordable finance to meet the upfront capital costs of a SHS. The mid-term report also found that the villages had

limited awareness of the SHS option and also had incorrect perceptions on the reliability of SHS.

The recommendations from this review were that the SHS companies should focus on promotion and selling the systems and micro-finance institutions should be encouraged to become involved in the project.

The industry generally agrees that the main reason for the later rapid growth in sales of systems was the introduction of the micro-finance institution SEEDS as a PCI. They have a large rural network, which enabled that institution to reach many villages and therefore potential system owners in the remote regions. SEEDS was active in promoting micro-finance for SHS.

Another contributing factor to the success of the project was the support of SHS given by some government agencies. In particular the Uva Provincial Council (UPC) had accepted that grid connection in that province was expensive and will take many years to complete. The UPC therefore launched a programme that promotes the use of SHS with a grant of Rs10,000 (approx US$100) per system. This scheme resulted in 6000 homes in the Uva province purchasing a SHS and that province contributed a full 50% of the market in 2001.

Lastly, local capacity must be developed to allow for in country training of technicians. The capacity building activities undertaken during the programme contributed to creating a local technical capacity to support the development of solar PV in Sri Lanka. Capacity building and in country training actions should continue to further support the development of the PV sector.

The ESD program was completed in December 2002 but it has been followed by the Renewable Energy for Rural Economic Development Programme (RERED). This program will continue the support of micro-financing SHS though the GEF grant will not be as generous.

The project had a side benefit in that it encouraged the small number of industry players to work together for the good of the whole industry. In so doing they created the Solar Industry Association of Sri Lanka (SIA-SL) who obtained financial support from the ESD.

The SIA is a non-profit organization that has two full time staff. It acts as a catalyst between the industry, the Government and the World Bank. It has worked actively in helping with all promotional work of the ESD and solar in general. This has been undertaken by working closely with the Sri Lankan Business Development Centre to promote solar at the grass roots level.

The SIA has coordinated the capacity building within the industry through technician training courses. Capacity building activities of the project are described in more detail below.

5.4.8 E & Co.

E&Co was established in 1994 as an independent non-profit organization with the strategy of providing enterprise development services and modest amounts of money (up to US$250,000 in the form of loans and equity investments) to economically, socially and environmentally sustainable energy enterprises in developing countries.

E&Co offers a combination of support products including tools and training, enterprise development services and start up financing. They offer debt at affordable

rates and share equity allowing greater involvement in the enterprise and resources post-investment. Portfolio is weighted towards loans, as lower risk. To date E&Co has supported over 90 sustainable energy enterprises in 34 countries investing US$9m dollars. The investments have leveraged over US$38m dollars of co-financing.

E&Co has also structured a Venture Capital Facility for small and medium enterprises where a reasonable rate of return is required. Matching funds are needed before investment.

One example of an enterprise supported by E&Co is Soluz. Soluz, Inc. is a corporation founded in 1993 (based upon the track record of a small PV supply enterprise founded in the Dominican Republic in the 1980s) which has built two rural energy delivery subsidiaries, Soluz Dominicana and Soluz Honduras. These two operations combined have supplied over 5000 PV systems.

The company is capitalized with equity and debt financing. Investment to the project came from the Triodos Solar Investment Fund, *Corporacion Financiera Abientaml* and Sunlight Power International. In addition funds were provided through GEF and E&Co as well as USAID.

Soluz Honduras's revenues are from the sale of PV equipment and services to rural customers in local currency. The company sells SHS for cash or on credit and provides electricity services on a fee-for-service base, which is becoming more and more popular.

The two companies operate in a similar manner. In the Dominican Republic, Soluz is co-operating with an NGO on a rural credit programme that finances some customers in their geographical area. They also use their own capital to extend credit. However, the fee-for-service offer is really now the most common choice by customers.

By maintaining ownership of the PV system assets, Soluz is able to provide them at affordable monthly rents, ranging from US$10-$20 per month, prices equivalent to that now paid for kerosene, dry cell batteries, and the re-charging of car batteries for TV usage.

In cash as well as credit sales, ownership is transferred upon installation; in the latter case, however, sales are conditional, with the final title secured upon completion of pre-signed payment stubs for credit sales. Therefore, the complete system is used as collateral. For fee-for-service business, the ownership of PV systems is retained indefinitely by the company. However, the battery is the property of the customer.

Soluz has experience with cash, credit and fee-for-service and continues to offer all three financial offers in Honduras. After experience was gained with cash and credit models, the fee-for-service option was offered to significantly expand the energy service impact of the company through commercial growth. The bulk of customers prefer the fee-for-service option.

Lessons Learned

E&Co believes that it has been effective because:

- it has a local enterprise centred approach providing affordable capital when it is most needed;
- risks are mitigated through enterprise development services;

- E&Co works directly with entrepreneurs rather than having a lengthy due diligence. They provide support both pre-and post investment. If a project/company fails then the losses are written off;
- risk is diversified through co-financing partnerships with social investors and lenders;
- begin small providing funding in small branches as company grows and demonstrates its ability;
- equity is provided only when an enterprise shows significant growth capacity; and
- risks diversified by technology (27.5% hydro, 22.2% PV, 16.7% energy efficiency and 33.6% other).

5.4.9 Africa / Brazil / China Rural Energy Enterprise Development (AREED / CREED / B-REED)

The United Nations Environment Programme has initiated three Rural Energy Enterprise Development initiatives in Africa, Brazil and China (AREED, B-REED and CREED). They seek to develop new sustainable energy enterprises that use clean, efficient, and renewable energy technologies to meet the energy needs of under-served populations, thereby reducing the environmental and health consequences of existing energy use patterns.

The REED approach offers rural energy entrepreneurs a combination of enterprise development services and start-up financing. This integrated financial and technical support allows entrepreneurs to plan and structure their companies in a manner that prepares them for growth and makes eventual investments by mainstream financial partners less risky.

REED provides early-stage funding and enterprise development services to entrepreneurs, helping build successful businesses that supply clean energy technologies and services to rural customers. Services include training, hands-on business development assistance and, for promising enterprises, early-stage investment and assistance in securing financing.

The REED initiative also works to broaden the skills of organizations involved in the energy and investment sectors to nurture energy entrepreneurs.

Implementation and Flow of Funds

REED works with NGOs and development organizations on clean energy enterprise development. This helps prepare them to identify potential energy projects and to provide follow-up business support services to entrepreneurs. Resource tools are also developed and disseminated that focus on business planning, management structuring, and financial planning for the rural energy sector.

REED works with financial institutions to assess the rural energy business sector and integrate it into their portfolios. This is accomplished through workshops and specific hands-on tools, centred on rural energy markets and enterprises, appropriate project finance models, financial analysis and risk management issues. Opportunities for co-financing are also explored.

Training and tools to help entrepreneurs start and develop energy businesses include:

- enterprise start-up support in areas such as business planning, structuring and financing;
- seed capital for early stage enterprise development; and
- partnerships with banks and NGOs involved in rural energy development

5.4.10 Triodos Renewable Energy for Development Fund

Triodos Renewable Energy for Development Fund is a source of finance and business development support to private sector enterprises, financial institutions and organizations that facilitate the introduction of and widespread access to off grid renewable energy services to underserved people in developing countries.

Triodos Renewable Energy for Development Fund is funded by public and private organizations who understand the important role the private sector can play in meeting energy needs in the developing world.

The Fund can provide finance to entrepreneurs and organizations that offer renewable energy solutions and services to un-electrified communities. The fund finances organizations providing the following technologies:

- solar (photovoltaic and thermal) systems ranging from 10 to 50 Watts for basic lighting, radio, TV, communication and water heating;
- small-scale wind turbines to relieve a shortage in power production or to serve as an alternative for solar energy;
- biomass for methane for clean cooking and heating. Finance is crucial to spread the high initial investments over time and make the technologies affordable;
- small-scale hydro projects to offer a reliable and sustainable source of electricity, provided that the project is technically and environmentally well designed and a sufficient constant water flow is at hand; and
- hybrid projects.

Implementation and Flow of Funds

Triodos Renewable Energy for Development Fund receives funding from the following organizations that all previously supported the Solar Development Group (in alphabetical order): Cordaid, Dutch Ministry of Foreign Affairs, Hivos Foundation, Joyce Mertz-Gilmore Foundation, Rockefeller Brothers Fund, Rockefeller Foundation, Swiss State Secretariat of Economic Affairs, Stichting Triodos Funds and World Bank.

Interested groups or organizations apply to the fund indicating their long term strategy, market potential etc. and the type and level of finance they would need to reach the potential. If the Fund is interested then a more detailed business plan is required.

The Fund finances the following type of organizations and companies:

- financial institutions, such as micro finance institutions and lease companies that provide finance to end users, for example for solar home systems;

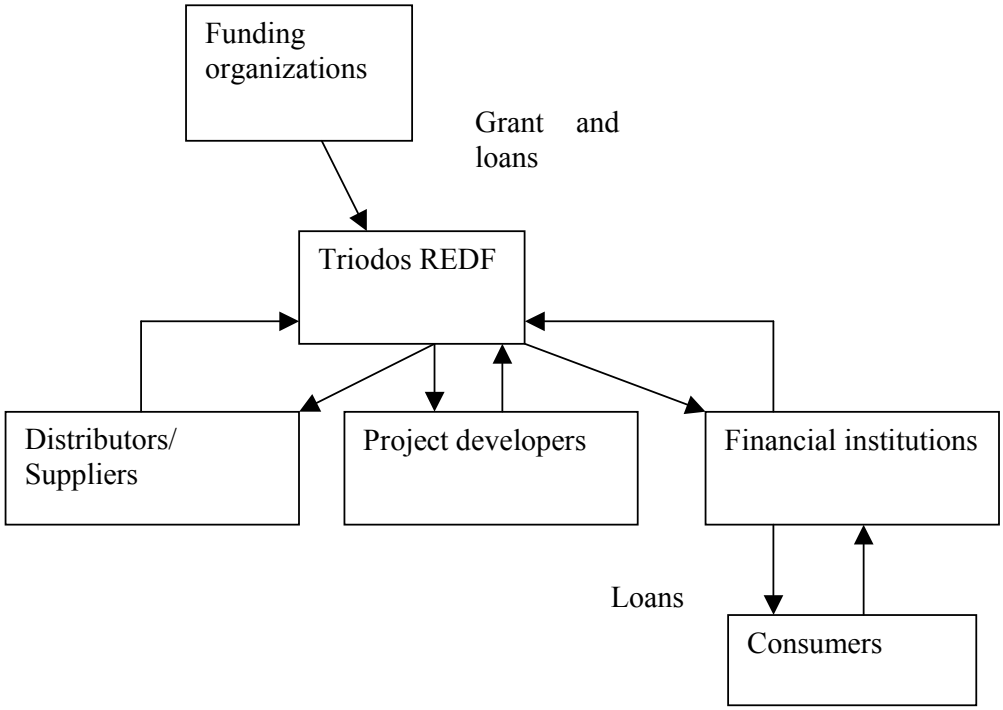
- trade channels: finance to allow local manufacturers and importers/wholesalers to finance their purchase of components and renewable energy equipment;
- distributors and retailers that distribute energy services or sell (renewable energy) equipment to end users, for instance through networks of local agents; and
- project developers that focus on bringing power production capacity to underserved and/or off grid areas.

The Fund has its geographic focus on Asia and Africa with an emphasis on the following regions:

Africa: East Africa (Kenya, Uganda and Tanzania), Southern Africa (South Africa, Namibia, Mozambique and Angola), Western and Francophone Africa (Senegal and Ghana).

Asia: South and Central Asia (Nepal, India and Sri Lanka), South East Asia (Indonesia, the Philippines, Bangladesh and the Mekong region).

The Fund can adapt its geographic scope to a limited extent, depending on specific circumstances. The investment staff in each region and the portfolio managers can advise on possible future expansion.



5.4.11 Dexia Micro-Credit Fund

In 1998, Dexia Banque Internationale à Luxembourg created the SICAV Dexia Micro-Credit Fund, the first commercial investment fund designed to refinance micro-finance institutions specialized in financial services to small companies in emerging markets.

Dexia Micro-Credit Fund represents a new class of assets that combines a dimension of considerable social impact with an attractive risk/return profile. Investors in the fund (retail banking customers, large investors, funds of funds) are attuned to the concept of socially responsible investment and cooperation between the northern and southern hemispheres. It is active in 19 developing countries in Latin America, Asia and Eastern Europe and finances 30 institutions. This number should increase, for the fund targets a growing number of micro−entrepreneurs and stable institutions, which are also multiplying.

To manage its micro−finance portfolio, Dexia Asset Management relies on the Swiss firm BlueOrchard Finance, who specialize in managing assets of this type. BlueOrchard selects the micro−finance institutions through a comprehensive network of contacts in multilateral development institutions, national cooperation agencies, and non-governmental organizations working in the field. On the basis of BlueOrchard's evaluation the financing committee decides to invest or not. If so, the institution reports on a monthly basis over the whole life of the investment and it is visited every year. Selection criteria are always based on an analysis of the quality and pertinence of the work of each micro−finance institution.

5.4.12 Green Investment

JREC Patient Capital

The Johannesburg Renewable Energy Coalition (JREC) was established in September 2002 after the Johannesburg World Summit on Sustainable Development (WSSD) and JREC Patient Capital is supported by the European Commission. The Patient Capital Initiative (PCI) is a public sector investment initiative aimed at providing a sustainable financing scheme that could trigger significant private capital investment in the period 2005-2008. Patient capital is equity funds with return requirements below commercial norms so it is an investment structure for developing markets aimed at realising these externality benefits and thereby significantly accelerating growth of viable enterprises in the sector.

Small island states are of particular interest to the PCI and funding will be provided to the renewables enterprise and project sector including a broad mix of investment opportunities (e.g. wind, geothermal, solar, biomass and small hydro projects, consumer and SME finance vehicles, and manufacturing and assembly businesses).

The proposed structure for the PCI is to pool capital in a Fund of Funds[2]. This Fund of Funds invests in specialist or regional sub-funds, which in turn invest in projects and companies.

- Top Tier – a Fund of Funds: Like-minded public and private investors affiliated with the JREC process that are seeking to play a global role will pool their "patient capital" in a new Fund of Funds with a light operational structure.
- Middle Tier of Sub-Funds: The Fund of Funds will invest in existing or new sub-funds focussed on renewable energy and specialised by region or sector and managed by professional fund management teams. These sub-funds would

[2] Patient Capital Initiative Feasibility Study, DRAFT, Impax, May 2004.

attract substantial co-investment from commercially oriented investors (public, private and foundation).

- Bottom Tier of Investments: The sub-funds will invest in companies and projects consistent with their investment mandate. The terms of the sub-funds' investments would normally require co-investment from private sector investors at the company/project level.

5.4.13 Commercial Loans and Investment and Venture Capital (VC)

Co-financing for renewable energy projects and enterprises can come from the commercial banking sector and venture capital. This could be from local banks in each country which would require reassurance to enter the market.

VC investors invest and fully participate in early stage technology companies. They demand a large equity stake and the returns they expect are in the order of 50-60 percent.

[i] http://strategis.ic.gc.ca/epic/internet/insof-sdf.nsf/vwGeneratedInterE/so00390e.html

[ii] *Development Banking and Finance*. Victor Murinde, 1996 (p.207)

[iii] Economic Decarbonsiation – The next big bang for the financial sector, Ficci and Rabo India, November 2003, Delhi

[iv]References

Asia Pacific Economic Co-operation, Energy Working Group *Guidebook for financing New and Renewable Energy Projects* Prepared by Sustainable Energy Solutions, Aug 1998

Inventory of Sustainable Energy Funds, UNEP Finance Initiatives and BASE, September 2001

Sources of Financing for PV-Based Rural Electrification in Developing Countries, IEA PVPS Task 9, May 2004

[v] Multinational Development Organisations rarely accept proposals from private project developers, though the International Finance Corporation (IFC) of the World Bank is an exception to this and focuses on providing financing to private-sector developers. The ADB also has a small private sector loan facility.

[vi] *Finance for the Developing Countries*. Richard Kitchen, 1986.

vii http://europa.eu.int/comm/europeaid/index_en.htm

viii http://www.eib.eu.int/about/