Energy financing manual

and training handbook

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Acronyms and abbreviations

ELP	energy loan programme
kWp	kilowatt peak
NDBP	National Development Bank of Palau
PV	photovoltaic
US$	United States dollar

Contents

Summary

The Pacific region is particularly vulnerable to the effects of climate change and persistent high energy prices. In addition, higher prices of goods, transportation and household operations reduce investments in livelihoods, income, health and education. Financial institutions are starting to assist families and businesses to address these challenges.

This energy financing manual and handbook has been prepared with support from the International Renewable Energy Agency, the Secretariat of the Pacific Regional Environment Programme and the International Union for Conservation of Nature (Oceania). The manual has been prepared for the benefit of Pacific island countries, but could be applicable as a general methodology in other regions.

In the Pacific islands, there has been interest in replicating the successful energy program financing model operated by the National Development Bank of Palau (NDBP), which is highlighted in this training manual. The NDBP's Energy Loan Program is a model intended to provide a sustainable financing methodology for energy efficiency and renewable energy applications in homes and businesses. The program strongly relies on the participation and partnership of the various community stakeholders – banks, donors, electricity utility agencies, retailers and contractors. It is a collaborative effort that requires leadership as well as management, which is provided by the bank.

Under the model, responsibilities are distributed according to capacity and ability. Technical support is provided by the electricity utility and contractors. Materials and equipment are supplied by retailers, guided by input from contractors and government policy makers. Marketing is often performed by all parties. A key activity for a successful programme is continuous training, which usually involves all parties.

1 Introduction

Pacific small island developing states promote energy policies that include the conversion of their energy supply from fossil fuels to renewable energy, and increasing energy efficiency. However, there has been little private investment in these areas. With the exception of hydroelectric energy development for power generation, most renewable energy investments in the region have been through grants by donor countries and agencies. Although donor investment has been of great value in initiating the use of renewables and energy efficiency measures, large-scale private investment will be needed if the overall effect is to go beyond the pilot stage.

This manual and handbook aims to provide energy financing programme designers and users with resources to establish and operationalise their own energy sector finance programmes. It provides details on setting up the fund and administration, including solar photovoltaic (PV) (solar home systems) and energy efficiency components. The concept behind energy efficiency is to encourage consumers to use less energy (mainly electricity) without having to reduce the services that are provided by the energy.

The financing programme envisaged by this handbook draws on experience from the programmes established and operated by the National Development Bank of Palau (NDBP). Such programmes are generally referred to as energy loan programmes (ELPs). The ELP finances energy efficiency measures in residences, and renewable energy in homes and small businesses. It would assist Pacific small island developing states to reduce the increasingly detrimental effects of imports of fossil fuels, reduce greenhouse gas emissions, and reduce the environmental effects of fuel spills and air pollution associated with power generation.

The financing programme is mostly designed with development banks in mind, but is not exclusive to them. This is primarily because most developments in banks in the Pacific are policy instruments of their respective governments and are suitable for starting ELPs. Development banks are typically wholly government-owned corporations, and the goal should be to have energy financing provided by commercial entities. A challenge is to transfer similar forms of subsidy and technical support that are provided by the bank to private financiers. There are examples of private foundations that provide similar subsidy support in the Pacific, but sourcing these programmes or funds is beyond the scope of this manual.

To date, outside of Palau, there have been few loans by development banks for private investment in energy efficiency or solar energy, even though most Pacific island national development banks have the necessary authority to make such loans. This is because of three main barriers:

- Consumers are not familiar with the technologies, and fear that an investment in energy efficiency or solar PV may not be recovered through electricity savings.

- Even if consumers do request loans for energy efficiency or solar PV investments, development banks are hesitant to provide finance because they do not have the specialised technical knowledge needed to judge the financial viability of such finance.

- Few contractors in Pacific island countries have the capacity to design, specify, purchase and install solar PV generators or energy efficiency measures for homes.

In an attempt to lower these barriers to private investment in energy efficiency measures and solar energy for electricity generation, it is proposed that development banks support finance for these investments. Specifically, the promotion of renewable energy and energy efficiency investments through development banks, and building their capacity could meet the following objectives.

- Support development of the market for private investment in solar energy and energy efficiency. Development banks and other financial institutions can acquire the capacity to understand the characteristics of investments in these two areas, minimising risk.

- Support development banks in financing new home construction, or renovations of homes that include a high level of energy efficiency. Development banks need to understand the types of building components that can be included in new homes or added to existing homes to improve the comfort and energy efficiency of the homes.

- Support development banks in financing solar PV for electricity generation for on-grid or off-grid installations. Solar installations on private homes can clearly offset electricity bills. There needs to be a clear understanding of developing standard installation packages for solar energy that are suitable for residential on-grid and off-grid solar PV investment, and can be readily installed and maintained by local contractors.

- Assist development banks in designing programmes to monitor the energy investments that have been financed, to confirm how well the energy savings are paying for the investments.

Funds provided under an ELP are intended to finance a common package of equipment or benefits, which do not vary much between clients. This is not meant to limit the scope of any financing programme. Instead, it emphasises the need to design flexibility in a programme without undertaking excessive amounts of risk. An ELP can consider other types of renewable energy for financing, and its regulations should not prohibit other forms of renewable energy or efficiency; however, these transactions should require separate research and presentation for approval.

The assistance to be provided to participating development banks is in two parts: technical and administrative. The technical aspects, including description of the required hardware characteristics, and their installation and use, are covered by another manual. This manual is devoted to the development, administration and marketing of the financial components of the concept. It is important to note that other financing programmes are possible, but are not covered in this manual:

- financing provided to private end users or consumers
- third-party projects
- other forms of financing, such as leases or guarantees, and subsidies (from or through the bank).

2 Review of the enabling environment

The first step in developing an NDBP-style ELP for a financing institution is adopting the right strategy.

2.1 A policy-based strategy is advisable

The first point to consider in designing a programme for a financing institution is support for the national energy policy and related policies. Financing projects outside the scope of official policies, even if the financing institution is not a public agency, will limit access to necessary institutional, financial and technical support. The following list identifies the key policies or guidelines for consideration during establishment of an ELP.

National energy policy

Energy policy will identify the degree and type of support for renewable energy and energy efficiency. Donors will often use these policy statements to allocate available funding. These policies, which could be provided in law, may establish the structure of the energy sector in the country and outline processes for developing projects. Common offices in the framework would include the electricity utility, energy office, ministerial office, steering committee and regulatory authorities.

Net-metering law

Although a law is important, it may not be available. Other options are possible – for example, a memorandum of understanding with the electricity utility for a limited trial of installations of PV systems connected to the grid.

Building codes

Building codes are uncommon in the Pacific region. The financial institution could adopt the Uniform Building Code and International Electrical Code as policy for its projects.

2.2 Know the agencies involved, affected or responsible

The roles, motivations and programmes of various parties in the energy sector can differ. Typically, the national energy office is responsible for policy, planning, statistics and donor coordination. It will often work closely with the electricity utility, which is responsible for providing electricity and protecting the grid. Both are important stakeholders of financial institutions, delivering residential and commercial PV systems, and residential efficiency programmes.

It is important to note that the government, through its energy office, will commonly work on commercially sized installations for on-grid PV systems financed by donors, and outer island residential or community building installations of off-grid PV systems financed by donors – sometimes without the utility's participation, knowledge or even standards. These types of projects

might need to be better coordinated to avoid conflicts and duplication. At the same time, these projects present opportunities to prove technologies and methods that would be useful to an ELP. The need for parts and spare equipment will often lead to development of the energy sector and private industry to provide these goods.

Keeping up to date on large on-grid installations will also help in understanding the size of market opportunity for the ELP. Given limitations on the amount of power that can be safely connected to the public electricity grid, the utility will need to understand that ELP installations may not adversely affect the number of installations possible and may instead help to reduce demand from less profitable clients. This is important to utilities because energy demand from residences is usually lower during the day and generation is spread geographically, reducing instability on the grid. Issues such as this should be discussed with utility officials.

2.3 Consider economic as well as financial benefits of the financing programme

The financial institution should try to quantify the benefit and costs of its programme as much as possible. An ELP is more than a financing mechanism and can further the energy aspirations of the country. The financing institution should examine the economic benefits for stakeholders that will result from the operationalisation of an ELP, such as reduced fuel imports, reduced utility subsidies, increased national investment, new industry and increased businesses. In addition, the institution could financially benefit from the programme through diversification of its portfolio, and reduction of risk default for existing customers who are sensitive to rising fuel prices.

Financial institutions also need to consider how their clients benefit economically and financially. Generally, financial benefit is where a customer pays less in costs and is better off; this includes money saved or received over the life of an investment. The question of whether or not the bank's clients are better off from participating in the ELP should be clearly understood.

Other stakeholders also benefit. Retailers expand their product offerings; contractors expand their businesses through new customers, and can distinguish themselves from their competitors by participating in the ELP. Customers of the utility who are usually subsidised lower their consumption. The ELP allows the business sector to use more electricity to grow.

2.4 Plan for the programme result: sustainable financing and commercialisation of energy programme

Why has energy financing been difficult to implement in the Pacific? A large part of the explanation is that there is usually no, or only a low level of, energy industry in the country. This means that there are usually few consultants, especially local consultants, in these small markets to help develop or sustain a programme. High costs of the necessary equipment have also contributed to undeveloped energy sectors in the past. Costs have now declined, and technology, awareness and acceptance have improved. Awareness of the impacts of climate change has also contributed to the

acceptance of renewable energy technology. These factors have opened up opportunities to develop and implement a successful ELP in the Pacific. Risks remain, however, as a large part of the programme includes grant money to subsidise energy efficiency and renewable energy projects. Since this strategy is obviously not sustainable, plans should include reduced subsidy rates and new permanent subsidy sources – these are likely to be from partners who benefit from the programme.

Another risk is from governments obstructing private sector participation. From a development bank perspective, the ideal situation is where commercial banks, consultants and retailers assume and lead these energy projects. There may be a tendency – which should be avoided – for development banks to become protective of their programmes and compete with the private sector. Instead, the banks should partner with, and support, the private sector until it is no longer needed. This is the 'end game' that should be pursued for establishing an ELP.

As the ELP is implemented, it will continue to change. The reality, as with most issues involving finance, is that new opportunities will present themselves. Banks should be diligent and continuously watch changes in their environments. Developing programmes to address changing needs, focused marketing, continuous training and direct engagements are necessary attitudes and behaviours to adopt for all sectors – not just energy. There is also a need for leadership. Although the electricity utility is often one of the key agencies in the energy sector, its main motivation is to sell power rather than to replace it with renewable energy sources or reduce demand. This is why the financing institution is ideally suited to lead and coordinate the development of ELPs.

Exercise 1: Environmental review

1. List the national policy, statutory, regulatory and guidelines instruments that are applicable to energy programmes in your market.
2. Define the key objectives (for efficiency and renewable energy) in national energy policy for your market.
3. Identify the parties involved (or that should be involved) in your ELP and their role.
4. List the benefits and costs of the ELP you would like to develop.
5. Describe what your ELP will look like five years from now.

3 Programme design

3.1 The range of energy programmes

A wide range of programmes could potentially be financed, but it is better to focus on a few and launch them on a limited basis to build competence and success. As the reputation of a financing institution is often its greatest asset, this approach is often the wisest. The range of energy programmes will also depend on the products the bank provides and is familiar with supporting. For instance, housing finance programmes relate well to financing of energy efficiency and residential PV systems. Business lending relates well to PV installations for business. The programmes discussed in this manual are:

- energy efficiency measures in construction of new residences
- energy efficiency measures in retrofits of existing residences (renovations and extensions)
- installation of on-grid PV systems for residences and businesses
- installation of off-grid PV systems for residences.

It is important to keep the financing programme open to consider all renewable energy projects, including solar water heating, energy-efficient appliances, and other renewable technologies such as windmills. New products can be considered based on the availability of information on the effectiveness of, and experience with, these technologies, including on similar islands in the Pacific. These technologies can also be reviewed on a case-by-case basis by the bank or a consultant. This process is outside the scope of this manual.

3.2 Defining the market and loan portfolio sizing

Before any programme is launched, the bank should conduct a market assessment to identify the possibility and potential of the various ELPs being considered. Examples are described below.

Household market (PV)

The residential PV market in 'Country A', based on the 2005 census, was determined to be made up of 4,308 households. The electrification rate for these households was high, at 98.9%. After some research with the power utility, it was determined that it would take an average of a 3.5 kilowatt peak (kWp) PV system for most households to offset their electricity usage.

Note that the electrification rate and average usage per household should be high for residential PV loan programmes to work because of the high cost of PV systems.

Business market (PV)

Using a similar approach, it was determined that Country A's commercial sector comprised 864 businesses. Based on average usage, a system of 15.1 kWp would be needed to offset typical

usage. It was recognised that many small businesses were operating out of buildings that were basically houses; many were neighbourhood stores. For this reason, these businesses were included in Country A's PV financing programme. Electrification rate and usage are also applicable here. Generally in the Pacific islands, household electricity tariffs are subsidized and hide the true cost displaced by efficiency or renewable energy programs. At the same time, electricity rates for business like in Country A are not subsidised so this is less of a concern.

Unit costs

The cost of PV installations in each country need to be calculated to determine the portfolio size for the financing programme, once the size of demand is determined. In Country A, the initial equipment and installation cost per kilowatt peak was $8,500. Energy office staff or retailers in each island market may be able to identify the unit costs for the bank at little or no cost. The trend for prices has been a decline, so recent information should be sought.

Portfolio size

The next step is to determine the financing requirement per sector (for PV totaling $3,044,728 in Country A):

- household – $1,292,638, translating to a market penetration rate of 0.32%
- business – $1,752,091, translating to a market penetration rate of 0.10%.

Household market size (energy efficiency)

New construction can be determined by the number of houses that are usually built each year, the likelihood that the number will increase or decrease in the next five years, and the number of house loans the bank finances each year. The expectation is that the number of houses financed will increase because of the additional attractiveness of the ELP. The agency that issues building permits in the country and the national census are good sources of information. Banks should pay particular attention to statistics on the usage and prevalence of electrical devices that heat or cool (such as air-conditioners, hot water heaters and electric stoves), which generally indicates the need for an ELP. If the bank lends for housing, a survey of its housing customers could also be useful in determining the size of the market.

Of course, the amount of available space to build in a country will be a limiting factor for new houses. However, even if land is not limited, the age of houses should be considered, since this affects the need for demolition and rebuilding, as part of the market for new homes. The alternative to new home construction is renovation or expansion (together referred to as retrofitting); the rate of retrofitting will be based on both the number of houses in a country and the housing portfolio of the financing institution which are both sources for retrofitting customers.

Clients who have already paid off their loan should be included, as well as clients who have at some stage been declined for a loan because of too much debt or low income – their circumstances may have changed since then.

3.3 Use 'additionality' to launch an ELP

The ease and adaptability of an ELP to a financial company can be increased through the use of an existing loan programme's forms, approval procedures, design criteria, inspections, contract eligibility lists and existing funding sources. This is called *additionality*. The ELP becomes an extension of the existing programme, thereby reducing the risk of new programme implementation and simplifying integration. The added advantages are additional businesses in the existing loan programme because of the ELP, and new funding to supplement existing sources.

Subsidies are intended to entice borrowers to incur either new debt or additional expenses. For instance, instead of buying a new roof, clients could build a redesigned roof that is more energy efficient and strong enough to include PV panels. Note that subsidies can take various forms and do not necessarily require cash funding. They can take the form of lower interest rates, tax breaks, longer loan terms, direct cash to clients, product gifts through vendor alliances (such as a free energy-efficient refrigerator), or a combination of any of these.

The strategy of adding energy benefits to an existing loan programme also means that energy benefits can be easily altered or even removed from an existing programme if funds for subsidies are no longer available. This strategy also means rapid implementation of the programme and use of established programme activities, such as marketing.

Training

There are challenges to implementing an ELP, even when it is delivered under an existing loan programme. They are often a result of unclear information. These challenges are best addressed through training to ensure that customers are not confused about what benefits they are receiving and how they can obtain these benefits.

Required training should be repeated regularly. Parties that would be invited to training are bank staff, retailers, contractors, energy office staff and others, based on the particular market's requirements. Training can be tailored for each group, but there is benefit in having all parties attend the same training programme through partner development.

In addition, the ELP may change as it grows. Implementation should be flexible to enable adjustments to be made quickly. These adjustments are partly why training must be provided continuously. Training is also a form of marketing and will motivate partners. It will also drive the momentum of programme implementation as partners are reminded during training to promote the programme.

Administration

Extending financing is not necessarily complicated, but technology and new programme implementation can be highly complex. Close attention is warranted. Banks may consider using one senior staff member as the lead programme administrator; this person will mainly be a programme coordinator, and can maintain their existing position and duties. They will help to organise the vendors, customers and bank staff to promote the ELP. Additional compensation or higher-level responsibility may be considered for the additional duties of this staff member. Ideally, this person would be a loan officer, but they could be another staff member with the necessary management skills and personality to fulfill the responsibilities. Duties will include:

Exercise 2: Programme design

1. Identify a loan programme that is most appropriate to add an energy efficiency or PV system in your company.
2. List the ways that energy benefits can be provided through this programme.
3. What will subsidies finance so that customers will want to borrow from this energy programme?

- coordinating marketing efforts;
- encouraging and assisting loan officers with programme promotion and implementation;
- monitoring and reporting on programme implementation;
- liaising with donors;
- liaising with vendors and contractors;
- coordinating training; and
- reporting to management and donors.

4 Contracting

4.1 Contracts with contractors and retailers

An ELP is a bank programme, and lending is highly contractual. Many aspects of the loan programme will involve contracts or representations. Some tips that can be considered in programme design to ensure that the ELP delivers the intended benefits over the long term include the following.

- **Eligibility lists** - Use eligibility lists for contractors and retailers who are allowed to participate in the programme. Being on the list is prestigious and also promotes compliance with the bank's programme.
- **Product specifications** - Use specifications for products used in the financing programme, as well as for installation of efficiency measures and equipment, to protect programme quality

- **Vendor contracts** - Commitment and performance from contractors and vendors can be improved when requirements are specific and in writing.
- **Installation contracts** - Require contractors to sign installation contracts. Contracts for installation that include maintenance requirements encourage businesses to install equipment correctly and suggest potential downstream income from their participation. Contract terms can be from one to three years; longer is better. Funding for maintenance costs can be captured as part of loan payments and held until needed, to assure contractors of payment. Replacement costs and insurance premiums can also be part of loan payments.
- **Warranty** - Require warranties, including for equipment, to provide quality assurances to clients. Installation warranties covering minor defects can be for up to one year; equipment warranties can be for longer periods. Consider obtaining warranties from manufacturers, contractors and vendors.
- **Insurance** - Insurance should be considered for the borrower and for vendors, as applicable and available. For instance, insurance on equipment that is removable can be provided separately from the house insurance. Alternatively, the house including the equipment should be insured.
- **Supply contracts** - Supply contracts can be arranged for vendors to carry inventory (whether the bank purchases the equipment, the retailer purchases the equipment, or both purchase components).
- **Reporting** - Requirements for vendors, contractors or customers to report on activities or benefits could be added to contract terms to ensure quality and for programme review.

Exercise 3: Contracting

1. Identify three partners that might sign contracts for goods or services.
2. Identify the terms that will be included in your programme's contract.

4.2 Supervision

Partnerships are critical to the success of an energy-financing programme. Partners may include: Ministries, utilities, the energy office, retailers, donors, media, consultants, builders and consumers.

Given the number of partners that may be involved in the ELP, it is recommended that a project manager be chosen to oversee, coordinate and report on the programme and its activities. Ideally, this should be a supervisor or senior officer under the bank's loan programme who works on the ELP. The manager will oversee the programme and can be the main resource person to monitor whether the programme is run correctly. The manager will work closely with the chief executive of the bank, who typically will deal with high-level partners. The chief executive is not recommended to be the same person as the manager because of the amount of work and attention needed for the ELP.

As noted above, a key part of a successful ELP is partner training and development. The project manager may be a trainer for some of these partners, but partners such as the energy office or consultants can also be used in this capacity. Training conducted by the energy office for ELP retailers or contractors is considered capacity building.

4.3 Standardisation of products to reduce complexity

When choosing standards, the bank should consider standardising efficiency measures and equipment that are available in the market, while retaining flexibility to add, modify or delete requirements and/or products. Building codes are key standards that are useful for an energy efficiency programme. If no building codes are required in the country, the bank might consider requiring some standards in the financing requirements or contracts with clients or partners.

The Uniform Building Code and International Electrical Code are available for contractors to use. The bank's architect, engineer or facilities manager can review plans against these codes. Alternatively, contractors can review other contractors' plans against the code. Additionally, a technical expert may also be needed for advice. In this way, the standards are enforced while not unduly increasing the costs or length of the project.

In construction projects, efficiency measures could be considered as part of the mandatory design for ELPs. The requirement for mandatory efficiency measures in household designs will eliminate questions that may be raised regarding differing requirements of clients that could be seen as discriminatory based on income. It will also be cheaper for the bank to keep the number of variations of its lending programmes to a minimum.

Customers could be offered some choice within the ELP. For instance, basic efficiency measures can be mandatory, and further optional measures can be included. Examples of efficiency measures are provided later in this manual. For PV systems, different sizes can be offered in 'kits'; such kits should be sold based on the amount of benefits they provide, to avoid marketing of the programme becoming too technical.

4.4 Use of subsidies

Subsidies are the biggest seller for the programme, if used correctly. The amount of subsidy should be based on actual savings derived from the programme – for example, the cost difference between an awning window (more efficient and expensive) and a sliding window (less efficient and expensive). This suggests that a market study should be completed to determine where the most energy in the household is being used. Usually, it will be appliances or features that heat or cool the house. The Pacific is usually warm all year round, and the most common appliance to consider addressing is air-conditioning. Electricity-based water heating and cooking is likely to be second. A viable loan programme to consider would be to finance appliances. Such a programme is outside the scope of this manual.

4.5 Incentives and marketing

For an ELP to be successful, it needs to be actively promoted to builders, retailers and owners by the bank and its partners. Customers have different demands and preferences, and these should be considered in the type of marketing conducted. Businesses view electricity as an expense and relate any loan for energy to their bottom line and cash flow. These would be the points to emphasise in marketing to business. Marketing should also consider client income levels and how much customers want to be like their neighbors. Rural housing differs from urban housing, and a neighbourhood store differs from a department store when it comes to needs and the right marketing message.

Typical channels for marketing delivery are radio, television, brochures, booklets, personal selling, cross-product selling (e.g. selling a housing loan with a consumer loan) and event-based selling (community events). One of the important marketing partners or channels to consider in the Pacific islands is churches. Specific examples of marketing activities to be conducted are:

- raffle for initial clients
- talk shows on radio
- talk shows on television
- brochures left under car windscreen wipers
- video advertisements
- posters (in public areas and at the electricity utility)
- school visits
- bank presentations
- contractor selling

- retailer displays and demonstrations in store (e.g. bulbs)
- direct bank selling through housing programme
- cross-selling with other bank products
- energy audits.

Model homes can be used to enable clients to provide an objective evaluation to other customers. The bank can take the lead in identifying ideal type of customers who can own model homes. This approach of using customers as models appears less self-serving in the customer's eyes. This is in contrast to using demonstration houses (usually not occupied, or in use by business or government). People would rather trust their peers' experience with model homes for energy efficiency and renewable energy products. In addition, homeowner experience is more valuable when it is based on residential home models, rather than office models. The recommendation in this manual is to use model homes instead of demonstration homes for home energy efficiency and PV system financing programmes.

Marketing will differ between residences and businesses, and between businesses of different sizes (small, medium and large). Micro and small business are similar to households with regard to the types of equipment used and energy use behaviors commonly practiced in a home. The bank should understand the different usage behaviors with energy for these groups to be able to target the needs and motivations of clients appropriately. To sell the ELP to the target group, the best marketing is a successful programme that leads to more comfortable homes and lower expenses in business, which will encourage clients to recommend the ELP to their friends and associates.

4.5.1 Marketing message

The following marketing messages can be considered for residential clients. Clients need to see savings and consistency of electricity usage, and will look at data rather than emotion as their motivation.

Table 1. Marketing messages for residential clients

Marketing messages	Efficiency message	On-grid PV system	Off-grid PV system
Benefit of a renovated and comfortable home	X		
More valuable home (valuation)	X		
Saving of money from efficiency and renewable programmes	X	X	
Immediate payment to loan, which allows for lower future payments and immediate home equity	x		
New product in village		X	X
'future proofing' against increases in fuel costs and electricity tariffs		X	

Available power in remote areas that is quiet than generators and allows for use of modern household equipments			X
Possible savings in time and money (hassle-free) compared with using gas, kerosene or wood			X
Independence from reliance on grid-connected power			X

Exercise 4: Marketing initiatives

1. What marketing efforts will be most successful for your programme?
2. What types of incentives are most popular with your market?
3. What types of incentives can be offered that do not cost money?

4.6 Funding sources for loans or subsidies

Where does the money come from to finance an ELP? The funds are usually provided by donors and are often used only for subsidies. The bank should have funds to implement the loan part of an ELP. Some sources of funding (e.g. European Investment Bank) provide discounts on interest rates for environmental projects.

Known sources of funding that could be considered include grants (e.g. European Union, donor countries), loans (e.g. European Investment Bank) or technical assistance (e.g. Asian Development Bank, World Bank). Of course, there may be political issues that could affect the eligibility of the bank for some sources of funding, depending on the status of diplomatic relations with certain countries.

4.7 Use of consultants

Consultants are useful and sometimes necessary when assistance is needed to set up an ELP. The consultants might specialise in particular areas, and several may be needed to complete the overall programme. The bank should provide the overall strategy and goals of the programme to the consultant. Consultants should fill a supportive role in programme development, and the bank should drive the process at all times. Consultants can be used for various aspects of an ELP, including the following activities (these activities will differ depending on the market and programme):

- review of bank capacity
- review of market potential
- setup of programme
- coordination with stakeholders
- training

- launch of programme
- establishment of accounting system
- legal advice
- sourcing (especially of PV equipment)
- review and adjustment of programme
- general or technical support for programme.

Consultants should keep up to date with the current technology and trends in the energy sector, and should be able to obtain knowledge to adapt theories and concepts to local circumstances. They also should help the bank to understand how to deal with partner and client behaviours and motivations, especially when financing investments in energy.

Decision points to consider for consultations will be the level of education and experience in the financial institution, whether or not legal and other advisers are already on staff, and how much administrative support is needed. Consultants may not be needed to show the bank how to lend under an ELP if the ELP is adapted from an existing programme.

4.8 Establishing funding systems

Specific questions to ask when setting up an ELP include accounting for funding. This includes systems and procedures for handling programme funding and subsidy funding – for example, how the bank should handle the establishment of account numbers and creation of forms for requests for disbursement under the ELP.

Financing for housing construction should be issued in phases, based on completion of the house. These disbursements should be based on an inspection of the completion of each phase. A final review should be conducted when building is complete, which will include a certification of completion. ELP documentation would be included in the accounting forms and procedures that are already established.

Rules are also needed for asset management if equipment is involved – such as when financing PV systems purchased by the bank. Separate funding accounts should be created for subsidies available under the funding programme. An inventory account is needed if the bank carries any inventory for the programme. A loan code is needed to identify loans under the ELP. The specific code used will depend on the accounting and loan management systems used by the bank, the procedures used by the bank, and what is practical.

One useful practice to consider in accounting and loan management systems is to include future expenses in current collections so that the customer's cash outlay requirements in the future will be minimised. These future payments include insurance, equipment replacement, and maintenance

visits and service. The recommendation is to include a fraction of the future cost with each payment for the loan repayment. The bank's loan management system may allow for this type of reserve system. If not, it might be possible to create a separate ledger. One advantage of this system is that it builds good will with vendors that are partners with the bank by ensuring that payments are available for future business with the bank. This helps justify the partner's expense of attending training and organising their business to provide services and goods for the ELP.

Exercise 5: Funding system

1. Describe how and when subsidies will be funded in your energy programme.
2. When will subsidies be obtained – immediately and in the future?
3. What existing sources are available for subsidies?
4. How do subsidies relate to the benefits of customers under your programme?
5. How will subsidies be replaced in long term?

5 Underwriting

The following steps can be used when approving loans for an ELP. The bank's final procedures may differ depending on its mandate, current programmes offered, the market situation and the need for more sophisticated analysis. The approval document for the loan, which in this case is a credit memorandum to the approving authority and attachments are used for illustration purposes in this manual. Terminology and the specific approach may differ from bank to bank, but the decision points identified should remain the same. Again, the ideal approach is the bank's existing processes, as the ELP should be an 'add-on' to what is already in place.

Underwriting an ELP can involve the steps shown in Table 2.

Table 2. Steps involved in underwriting an energy loan programme

Application	1. Prequalification 2. Customer education 3. Vendor selection
Approval and structuring	4. Confirm measures and system 5. Analysis and Credit memorandum 6. Approval
Implementation	7. Contracting 8. Implementation and inspection 9. Final inspection and subsidy

5.1 Application

The first part of granting a loan is an application, typically received after marketing has been conducted.

Prequalification involves a basic interview with a client to ascertain their suitability for the programme. Note that this need not be specifically what the client came in to the bank to perform. The prequalification process can be performed for any customer identified as a potential client through an interview. It involves determining eligibility for the ELP based on customer needs and the programme criteria identified by the bank. The loans officer can utilize a prepared script as the questions for use in the interview.

Basic prequalification questions for an ELP include:

- Are you planning to build or renovate a house?
- Why are you seeking the loan (e.g. old house, larger family, new money)?
- Is the house going to be located in a remote area?
- Is the electricity reliable in the area where you plan to build?

- Are you going to build any other buildings on the site?
- Does your current housing have any energy efficiency measures?
- Have your current electricity bills been increasing?
- What is your current average electricity bill amount?

Questions should then be asked to lead into an education discussion:

- Have you heard of the bank's ELP?
- Are you interested in saving energy costs?
- Do you have time to look at some materials on the bank's programmes?

Customer education usually follows prequalification. It will be easier to show brochures and tables designed for this purpose to inspire and not confuse the client, who may not have expected this discussion when they visited. Table 2 is an example showing energy efficiency benefits for a new home. The example emphasises savings and benefits received from joining the programme.

Table 3. Energy efficiency benefits for a new home

Loan amount	Term	APR	Monthly payment	Interest cost
Example A:				
$65,000.00	20 years	8%	$543.69	$65,485.60
Less $6,000.00 subsidy	20 years	8%	$493.50	$59,440.00
	Savings:		**$50.19**	**$6,045.60**
Example B:				
$120,000.00	20 years	8%	$1,003.73	$120,895.20
Less $6,000.00 subsidy	20 years	8%	$953.54	$114,849.60
	Savings:		**$50.19**	**$6,045.60**
Subsidy amount: $6,000.00 Monthly savings: $50.19 Term: 20 years (240 months)				

The customer can then be shown Table 3.

Table 4. Energy efficiency savings

Energy efficiency savings		
Up front	$6,000.00	Subsidy
Over loan	$12,045.60	Reduced interest cost
Long term	Reduced power bill	15% monthly reduction
Long term	Higher-value home	From lower operating cost
Savings can be used to pay for food, medical expenses, child tuition or other expenses.		

Note that returns on investment for energy efficiency are usually higher than for PV systems.

For an ELP, marketing should include a visit to a model home or PV system before a loan application is lodged. The customer will be able to visualise and experience the benefit first hand.

Once the customer commits to applying for the loan, a vendor can be selected to develop the necessary plans for the customer's project. The contractor will need to either develop new plans or amend existing plans for the customer. They will also need to visit the site as part of this process. Once specifications have been decided, the customer will have the necessary information to lodge an application for the ELP.

5.2 Analysis

Analysis of the loan application should be part of the existing loan programme that is the basis for the ELP. Alternatively, it can be included as an addendum of the write-up that is submitted for approval. The choice is up to the bank as part of programme design.

Two important analyses are necessary for a new energy loan: plan review and financial analysis.

5.2.1 Plan review

Plan review can be provided by bank staff or outside professionals. In either case, the bank should confirm adequacy of architectural or other building plans (whether stock or custom plans) for an efficiency loan, and adequacy of equipment specifications for a PV system loan.

The review of house plans will focus on the measures that are adopted for the energy efficiency programme. As mentioned above, these include measures limiting heat, increasing airflow, and affecting the type of appliances and equipment used in the house. A site visit to assess the position of the house on the lot, and to identify structures around the planned house that may limit breeze or the size of the house's overhang is also important.

Efficiency measures involving heat avoidance include:

- house orientation – north facing with east–west roof ridgeline
- light-coloured roofing
- use of shade screen and window tinting
- use of radiant barriers
- wide roof overhangs
- adequate roof ventilation.

Efficiency measures involving airflow improvement include:

- fully openable windows – casement, louvre or awning (to allow air circulation)
- ceiling fans (air-conditioning is discouraged but not prohibited)
- soffit and ridge vents.

Other efficiency measures include:

- efficient appliances
- solar water heaters or point-of-use heaters.

Exercise 6: Measures

1. Where is your market's biggest energy need, and why?
2. Describe what an energy-efficient house would look like in your market.
3. What are the biggest household sources of energy consumption in your market?
4. Identify three measures that are most needed in your housing market.

The design of the PV system to be installed should also be reviewed. Usually, the contractor who will visit the home prepares this plan. They will review the strength of the roof to hold the system, and the size and angle of the roof, which will limit the number of panels possible. The location of any trees or buildings that will block the sun from reaching the system is also important. Lastly, the contractor will locate the utility meter outside the house and the power panel inside the house. This evaluation can be predesigned on a form that is completed by the contractor and submitted to the bank. The contractor should also verify that the necessary parts to install the system are available. This step of the ELP is often overlooked, which can cause unwanted delays.

5.2.2 Financial analysis

Efficiency savings

Efficiency savings generally refers to lower consumption of electricity, with a comfortable and safe house. The largest source of energy consumption in the household is usually air-conditioning, followed by use of appliances and then lighting. Behaviour is often the most important factor to consider in the analysis. Having and using appliances or equipment such as air-conditioners are important design considerations. The likely use of these appliances should be estimated, but this should not be used as the basis for declining the loan.

Efficiency sometimes means that a larger loan is required to replace certain features of the house planned. The cost of the house may be greater up front because of efficiency measures, such as a light roof colour and the type of roof material used.

To restate the process, the review of plans and the materials list for the proposed housing project will be one part of the analysis for efficiency loans. The other will be the existing consumption

behaviour of the customer, which can be obtained through interviews and visits to the existing home.

Efficiency measures

Examples of efficiency measures, for subsidy funding of the difference compared with the standard product, are shown in Table 4. To determine the subsidy, each measure is assigned a monetary value according to market prices for materials and installation. The bank should consult with retailers, architects and builders to determine these amounts. It should recommend consideration of key measures and allow for optional measures; offering the customer this choice should improve customer acceptance of the programme. The subsidy amounts shown here are for illustrative purposes.

Table 5. Examples of efficiency measures

Required measures	Optional measures	Subsidy (US$)
East–west orientation	Fully openable windows	600
Light wall colours	Tinted or high-performing glass	200
Wide roof overhang	Exterior window shading devices	200
White or light-coloured roof coating	Ceiling fans with speed controls	200
Continuous soffit ventilation	• Solar water heating system, instant (demand) water heaters, preparations for instant water heaters, or hot water piping insulation and • tank-type water heater timer or shutoff and • heat traps on water heater tank	1,800
Radiant barrier insulation		
Compact fluorescent lamps		

The subsidy component of the ELP is meant to entice the owner to adopt energy efficiency measures. However, the financial savings over the life of the house should be sufficient to justify the additional expense of using awning windows instead of sliding windows (for example). The subsidy also results in a lower repayment amount, a comfortable house and increased equity in the home, which should result in a higher value for the home. Therefore, the financial analysis of the energy efficiency home application will focus on lower household energy consumption (and expense) and higher values for the house.

Value for the house is usually determined by a real estate appraisal. This is important for markets that are more developed and where collateral values are important to loan underwriting. Even if

the value of the house is not important to the bank for collateral purposes, it may still be important to the customer, and should remain part of the marketing discussion and financial analysis.

Renewable energy

Renewable energy (PV) projects should result in savings from existing or expected power consumption and can be used to pay for the loan. The analysis is therefore on what the customer is already paying (or would pay) versus what savings are anticipated. Copies of recent power bills are needed to determine the amount of savings to be achieved (efficient homes and prepaid meters create a problem in this regard because they are associated with lower consumption levels).

For on-grid PV systems, energy consumption should be at least 200 kilowatt-hours per month for energy savings to be sufficient to pay for the loan. The exact amount used for this threshold will also depend on the price of electricity in the country. In the analysis, loan payment needs to be less than energy bill savings (average usage) before the customer's income level becomes important. Of course, affordability will remain important for approval reasons such as character assessment when evaluating customers' ability to pay. Collateral should be the PV system itself, and the subsidy already gives the discount to that equipment.

For off-grid PV systems, the analysis is based on the client's ability to pay. Normal credit underwriting should be followed. Here, the terms of the loan are important. Subsidy amount, interest rate and the length of the loan allowed under the ELP will help clients qualify for the programme. The cost of an alternative to the system should also be considered – for example, how expensive it would be to purchase and operate a generator or extend the public grid to the site. These amounts should be higher than the energy loan, or at least close to this amount. The rising cost of electricity should be included as part of any analysis of grid-connected energy.

5.2.3 Credit memorandum

The credit memorandum used to request the loan from the approval authority will usually include:

- client name
- purpose of borrowing
- type of request
- amount requested
- loan terms
- repayment source
- recommendation.

The ELP should be indicated as the 'type of request', for easy reference. The recommendation section should discuss, or at least refer to, the energy loan aspect of the decision. The necessary supporting documents should be attached or available for review.

The exact details of the format for approval will be outlined in the approval of the ELP from the board of directors.

5.2.4 Structuring and funding of the loan

Structuring of the loan is important to safeguard against the risk of the project not being completed or not delivering sufficient benefits. This applies to both efficiency and renewable projects. The recommended structure for energy loans includes phases for the project implementation, contracts with vendors and contractors, required inspections, and insurance and maintenance provisions.

Funding should be accomplished in phases. Payments should be issued after inspections for phase completion and certifications of energy measures. Implementation monitoring is also important to address any change order requests that may change the initial analysis. These requests should be reviewed quickly, as approval or disapproval will affect the likelihood of receiving a subsidy and therefore repayment ability. Final certification at completion of the project, usually from the bank's architect, should be required for final payment to be released to the contractor. This approach improves quality control and management of contractors, who sometimes agree to owner changes without bank approval.

5.2.5 Subsidy payments

Subsidy payments for efficiency loans are usually given against the loan principal after certification of compliance with efficiency measures is received from the architect or inspector. The subsidy for efficiency loans is provided in direct financing to the client's loan from the bank. The subsidy could also be paid directly to the vendor or contractor if the programme is designed in this manner. In any event, the subsidy should not be paid to the customer in cash.

The subsidy for PV systems is usually built into the purchase of equipment. It can also be recovered in loan financing if leasing is used. This can be accomplished by taking a deposit up front and purchasing the equipment at the end of the lease period. Leasing therefore reduces the principal amount to finance and therefore increases affordability. This scheme is outside the scope and discussion of this manual

5.2.6 Insurance and maintenance

Insurance and maintenance should be included in the loan repayment analysis. These contracts can be financed up front with the principal amount or captured with loan repayments from the customer and saved by the bank (in trust) to be paid to vendors at a later date.

Insurance is typically placed on the equipment itself at full cost of replacement. Maintenance should be based on the contract with the vendor over the initial period of the loan. This will be different from a warranty for installation, which the contractor should also agree to provide. This is why an eligibility list for contractors becomes important. Contractors receive an incentive from participating in the ELP, as well as prestige from working with the bank and the programme.

Exercise 7: Draft loan write-up

1) What is the recommendation (approval or disapproval)?
2) What is the client's name?
3) What programme is being requested?
4) Where is the project located?
5) What is the amount of the loan being requested?
6) What are the client's needs (efficiency or renewable energy)?
7) How much will the client benefit (savings in usage or generation)?
8) How will the loan be repaid (savings or income)?
9) Identify steps to complete in project and timing.
10) Identify partners to be involved in the programme.

5.3 Reporting

Reporting is often required for banks, national offices and grantors/lenders as part of the energy programme. These reports are used as a feedback mechanism for success of the programme as well as for programme adjustments that may be needed to improve success or correct failures. They are also important for marketing the programme and for general information to different stakeholders. For instance, other applicants may want to know the experience of home owners who have already installed efficiency measures or PV systems.

For this reason, reports from customers who are already under the programme are important. If these can be required, as in the case of model homes, it will be easier to obtain the information needed. Another way of obtaining information is having bank staff participate in the programme; bank staff may be more willing to share information on the performance of the home and use that experience to sell loans to customers.

Issues to consider for reporting involve the bank's portfolio, loan programme operations and energy sector information that is important to the country and donors, such as

- portfolio – loans in report period (volume, number, quality)
- profile of successful and problem loans
- status of recovery on loans and collateral
- subsidy funds balance
- programme longevity

- electricity avoided, fuel avoided, kWp installed
- participating vendors and contractors
- bank staff performance – number and type of loans financed.