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Module 20

Financing options for renewable energy and energy efficiency

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1. MODULE OBJECTIVES

1.1. Module overview

Financing is one of the largest barriers to the development of sustainable energy in Africa and this is true for both renewable energy and energy efficiency. This module will consider and evaluate the impact finance and the banking sector has on the development of renewable energy and energy efficiency.

In terms of renewable energy projects, particularly for rural electrification, a large amount of work has been conducted on financing models for the delivery of energy services to rural populations. A similar situation exists for energy efficiency in Africa, where the lack of access to finance impedes the uptake and development of more energy efficient methods of industrial production, despite projects being identified where considerable savings in both energy and cash are realizable.

This module examines what kind of laws, policies, regulations, and incentives could better facilitate or convince these financial institutions to actively participate and support the renewable energy/rural electrification sector and energy efficiency improvement projects in their countries.

1.2. Module aims

This module aims are as follows:

- To present the different financing models that have been developed and tested for renewable energy projects in rural communities and energy efficiency improvement projects.
- To explain the point of view of banking and financing institutions and the risks associated with renewable energy and energy efficiency projects.
- To give an overview of the possible approaches, policies and incentives to increase the involvement of banking and financing institutions.
- To show examples in different developing countries.

1.3. Module learning outcomes

This module attempts to achieve the following learning outcomes:

- To be able to explain the existing financing models, including the reasons for their success or failure.

- To understand which risks and elements are key for financing institutions when evaluating renewable energy and energy efficiency projects.
- To understand different options for policies and regulatory/support mechanisms to provide incentives for financial institutions.
- To be able to argue which policy or regulatory approach suits best, given the national or regional situation.

2. INTRODUCTION

The deployment of renewable energy sources and the realization of energy efficiency projects often require substantial amounts of money, in order to plan the project, purchase and install the equipment, as well as to train staff for the operation and maintenance of the system installed.

Renewable energy (RE) and energy efficiency (EE) projects have so far had a rather poor reputation with the financing community as they are still viewed as higher risk investments, resulting in stiffer requirements for investors and developers alike.

The reasons behind the relatively limited financing for renewable energy in Africa, thus far are multiple:

- Market-related issues:
  - RE and EE potential is often only roughly estimated;
  - A limited number of feasibility studies are available;
  - There are few RE/EE project developers active in the market;
  - Market information is still largely unavailable.
- Political and policy-related issues:
  - Most African country policy documents do not prioritize RE/EE;
  - Undeveloped regulatory and operational frameworks;
  - Operational risks and regulatory uncertainty.
- Technology:
  - High up-front costs of RE/EE projects compared to conventional energy sources;
  - Inadequate access to finance for research, development and manufacturing;
  - Perception of high investment risks by financiers.
- Inherent nature of projects:
  - Governments have traditionally been the main investors in energy and have tended to focus on centralized power projects, whereas the greatest potential for RE and EE is in decentralized projects;
  - Small-scale nature of the projects.

These factors usually result in the risk of a proposed RE/EE project being over-rated and the required viability hurdle rate becoming untenable. Affordable financing is therefore one of the critical factors inhibiting the wider realization of RE and EE projects.

As the issues, barriers and approaches for both RE and EE investments are to a large extent similar, the module will not be split up into separate parts on RE and EE. Different examples throughout the module will be provided focusing on either RE or EE projects.

3. THE FINANCIERS' PERSPECTIVE

Before looking at different sources of financing, it will be briefly explained how financiers make lending and investment decisions. Overall, financial institutions will aim to create a package that includes the total finance amount and: *(a)* the repayment terms, *(b)* the interest rate, *(c)* the repayment schedule and *(d)* any guarantees or securities.

3.1. Risk assessment and management

For any given project, financial institutions will estimate both the risks and returns of the project. The financier will analyse each individual risk and look at how to manage its potential impact on the project. As for the returns, the projected costs and revenues will be verified and then compared with the cost of the financing instruments to be used.

Different risk categories include business risk, country risk, market risk, money or interest rate risk, project risk, and foreign exchange risk.[1] For example, business risk includes the risks incurred in operating a business: raw material costs, sales volumes, fluctuating prices, affected by demand disruption, strikes, natural disasters, etc. Country risk includes the risk of regional economic recession, national economic mismanagement, and political unrest. Foreign exchange risk includes the possibility that exchange rates may fluctuate during the course of the loan. The risk finally depends on the design of the project or programme, e.g. the business model, time frame, location, etc.

The likelihood of a risk-event is generally assessed by examining similar programmes in similar countries that have already been completed. If no similar projects are available for comparison, financiers will consider the risk to be "uncertain". Many commercial financiers are usually unwilling to loan to projects with "uncertain" risks, except by applying higher interest rates to cover themselves in what is perceived to be a higher risk situation, or they may demand guarantees from international development financiers.

Ultimately the investors and lenders aim for a deal that allocates the risks to the party best able to handle them, that provides ways to measure the project's performance and that gives some monetary safeguards to project investors and lenders.

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

Distinct types of financiers look at renewable energy projects in distinct ways; investment bankers expect to earn a fee, lenders expect to receive long-term and fixed payments and equity investors expect to earn a shorter-term payback and return. Each of the players in these deals will do its own due diligence or examination of the project before committing money to the project. This analysis may include a review of:

- The business plan;
- Projected cash flows, margins, IRR, NPV;
- Reliability of technology involved;
- Creditworthiness of all parties involved;
- Likelihood of changes in regulatory and policy environment;
- Permits and environmental approval—required for project to begin construction and operation.

Once assessed, a risk never actually disappears—it is simply transferred (allocated) to somebody else's balance sheet. Project sponsors usually focus on business and non-commercial risks. Fund investors, guarantors and governments are often more concerned about operational and financial risks being taken on by the project sponsor relative to its financial and management capability.

Once a structure for risk sharing is identified and agreed upon, each of the key risks involved can be allocated and priced under contractually binding arrangements.

For projects in developing countries, governments (often backed by bilateral or multilateral agencies) need to partially or fully assume the risks that result from their own actions (or lack thereof) including policy, regulatory and country risks. Risks concerning events that neither governments nor project sponsors can control will have to be covered by insurance or other contracts/solutions from private sources. Where such insurance is unavailable or premiums are too expensive, then public assistance is required to mitigate the risk.

For example, the Multilateral Investment Guarantee Association (MIGA) was formed by the World Bank specifically to provide guarantees to development work.

3.2. Returns

After having assessed the risks, financial organizations are willing to lend or invest money when they expect to make a profit, e.g. a return on investment (ROI) or a return on equity (ROE). The return is generally earned in the form of

interest (in the case of loans) and dividends (in the case of equity investment). The higher the perceived risk of a programme or project, the higher the required return in order to attract investors to it.

A schematic overview of the methodology for analyzing risks and returns, and the resulting risk/return profile for a typical wind project are shown in figure I and figure II.

Figure I. Analysis of risks and returns

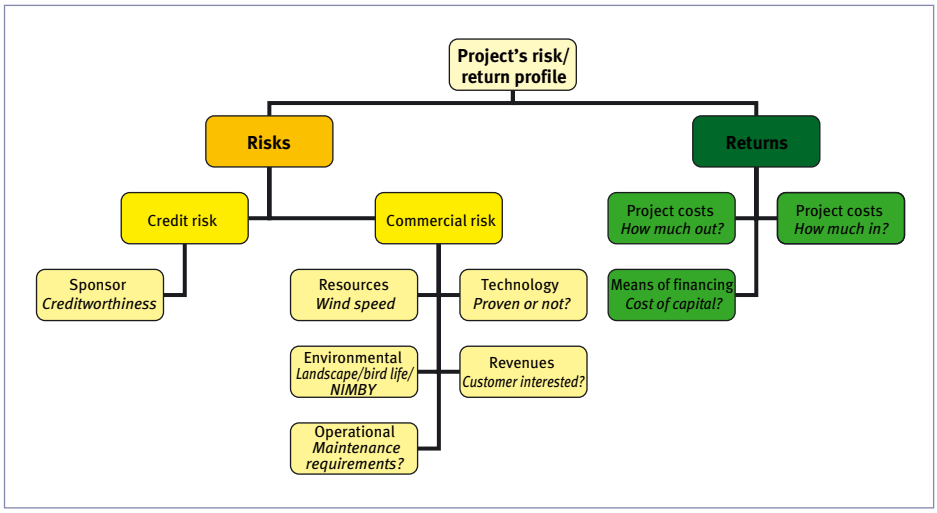
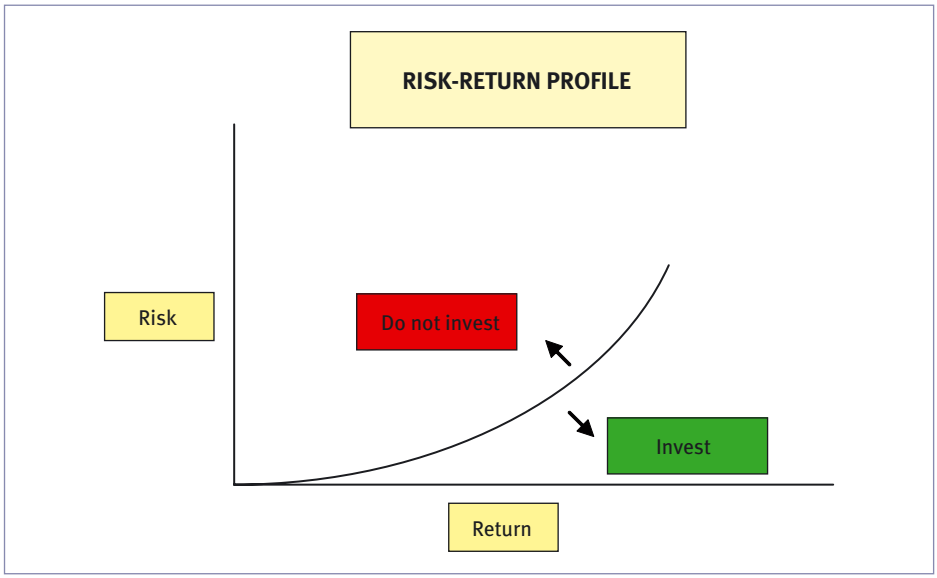


Figure II. Risk/return profile



4. BASIC TYPES OF FINANCING

4.1. Debt

Debt financing involves taking a loan or issuing a bond to provide capital and require repayment of both the amount of money borrowed and the interest charged on that amount. In contrast to equity investors, lenders who provide debt financing to a project do not own shares in the project. They provide capital for the purpose of earning interest. Because lenders must be repaid before distributions can be made to shareholders, lenders bear less risk than equity holders. For this reason, the potential return to lenders is limited to risk-adjusted market interest rates.

Loans are a very common financing vehicle for development projects because they continually replenish the development fund from which they are drawn. Loan payments usually must be made on a specific schedule, and if they are late or if the loan is defaulted, the borrowing organization may have an extremely difficult time accessing financing in the future.

The major sources of debt financing are international and national commercial banks. Other sources of debt financing include multilateral development banks (MDBs) and the International Finance Corporation (IFC), debt/equity investment funds, equipment suppliers, and private investors. These banks can play a major role by syndicating the debt financing of a major project among several banks so as to minimize their own risk exposure on any given project.

International funds dedicated to development projects will often create loans with generous repayment terms, low interest rates and flexible time frames. Such loans are called “soft-loans,” and precisely because of their lower interest rates and flexible terms, they are generally preferable to commercial loans.

An additional consideration with loan funding is that foreign loans are subject to foreign currency oscillations, risking that the principal amount borrowed and the interest owed could increase dramatically if exchange rates fluctuate. The economies of many developing countries tend to be unstable, and the costs of labour, goods, or equipment could fluctuate during the course of a long-term project, while the loan currency might fluctuate as well.

Subordinated debt is a debt instrument falling between debt and equity. Principally, subordinated debt is provided by a friendly investor or a project partner and is subordinated to other primary debt in case of project default. In return, subordinated debt usually commands a higher interest rate than normal debt to

reflect the higher risks associated with this investment. Similarly mezzanine debt refers to non-conventional debt that has a greater element of risk than secured debt but has less risk than equity.[2]

4.2. Equity

Equity investors provide capital in a project in return for a share of the equity of the project. It involves high-risk financing that expects high returns and therefore requires finding interested investors who are willing to buy into the project, and matching the investors with the project and the risks. It entails sharing ownership and/or revenues with the investment partner(s) through ordinary or preferential shareholding, including that equity investors maintain the right to get involved in the decision-making process of the project or company in order to protect their investment. The expected return on equity is generally two or more times greater than return on debt. In return for the higher expected yield, equity investors bear the greatest risks and have rights to distributions from the project only after all other financial and tax obligations are met.

Common investment channels to acquire equity financing include project developers, venture capitalists, equity fund investors, equipment suppliers, multilateral development banks, and institutional (banks, insurance companies) and individual investors. Because venture capitalists invest in new companies in their earliest and riskiest stages, they expect to earn even higher returns.

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.[3]

4.3. Grants and guarantees

Grants do not require repayment: they are essentially "gift" money with specific requirements or terms for use. Governmental and international organizations offer grants to promote environmental and development policies. Usually they include a statement of the work that will be performed using the money, including restrictions on how the money can be spent and the time frame during which it can be spent. Grants will often be directed towards the purchase of hardware and equipment required for a project.

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[2]strategis.ic.gc.ca

[3]strategis.ic.gc.ca

These financing vehicles often originate from private foundations, but can sometimes be procured from international development organizations such as the World Bank (WB), the Global Environment Fund (GEF), bilateral funding organizations, or through national renewable energy funding divisions as well.

Guarantees are a contractual promise from a financing or otherwise well-capitalized organization to take responsibility for payment of a debt if the primarily liable organization fails to pay. For example, when an individual purchases a house, the house is secured as collateral. If the individual defaults on the loan, the house may be claimed by the lender to offset the incurred losses. In the case of RE and EE projects, there is often little or no acceptable collateral to pledge as security against the risk of the loan. Instead, a developer might seek a guarantee from a large, well-capitalized organization, and should the project or national programme fall into arrears, the guarantor will cover the loss. This makes lending to and investing in RE and EE projects more attractive to commercial lenders.

Guarantees are offered by multilateral development banks and national development banks. For example, the Multilateral Investment Guarantee Agency (MIGA) is organized by the World Bank to help investors and lenders to deal with political risks by insuring eligible projects against losses relating to currency transfer restrictions, breach of contract, expropriation, war and civil disturbance, as such facilitating developing countries to attract and retain private investment.[4]

Review question

List the different types of financing and think of the (combination of) types that have been used to finance a RE or EE project in your country.

[4] www.miga.org

5. TYPES OF FINANCING MODELS

Thus far most of the financing for RE and EE projects in developing countries has been in the form of development assistance focused on providing technology in demonstration projects, and usually initiated and managed by the national government or external donor programmes.

In recent years new financing models have been developed based on local capacity and higher involvement of consumers. The best known are micro credit consumer programmes for small-scale RE systems, and seed capital provision for small and mid-size enterprises (SMEs) to assist local entrepreneurs in starting up new businesses in clean energy products and services. The rationale behind these deal structures is to prepare young enterprises for later growth capital from more commercial sources.[5]

It can be expected that in the near future these emerging and still perceived high risky sectors will continue to rely at least partly on non-commercial investment. Eventually though, RE and EE project development will have to be induced by market-based incentives, allowing them to attract conventional sources of finance.

The following section will present the most commonly adopted as well as the upcoming financing models in RE and EE development programmes.

5.1. Government-led model

As mentioned earlier, most of the financing programmes are still managed by a government body or donor organization, although the actual model can take on several different forms and include different market players.

For example in the PRONASOL[6] project financing programme in Mexico, the overall management and allocation of funds remained under federal government control, but it also involved some form of private sector participation, as a vendor of goods and services (not as the owner-operator) and a high degree of participation from the communities.

Approved projects were reviewed and technically approved by the utility Comisión Federal de Electricidad (CFE) in order to guarantee quality, before being let to tender to get the lowest prices.

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[5]www.uneptie.org/energy/projects/REED

[6]Financing Renewable Energy Projects—a guide for development workers.

The programme aimed at two categories for project financing:

- Productive users included agro-industries and similar applications. The funding consisted of a preferential loan scheme from the Mexican development bank, and the money had to be repaid from the project's economic surplus.
- Life improvement projects, such as electrification of individual houses, schools, communal houses and health clinics, were granted 50 per cent of the project costs from the federal government, 30 per cent from the state government and the remaining 20 per cent from the local government and the community (or the individual in case of housing electrification).

In both cases, the local community had to provide the financial means to pay for the operation, repair, maintenance and possible capacity expansion of the system, and mostly a revolving fund[7] was applied. This programme was part of the national poverty alleviation policy, was not supported by international funding, but it turned out quite successful in developing a PV market in rural areas. The programme increased the rural electrification level to over 40,000 systems.

In Chile, the rural electrification programme PER (Programa de Electrificación Rural) was primarily based on a 60-70 per cent subsidy from the state to cover the initial investment, but was furthermore designed for joint financing from the electricity companies and the users.[8]

Companies were required to invest their own resources and users contributed both to the investment phase and during the operation of projects, to increase their commitment and to support adequate service and maintenance. Users had to cover the costs of the in-house wiring, the electric meter, and the coupling to the grid. These expenditures, nearly 10 per cent of the costs of each project, were initially financed by the distribution company and repaid by the users over time. Once the project was operating, the users had to pay the regulated tariffs. Contrary to the PRONASOL programme in Mexico and in order to increase their commitment, the electricity companies were handed the ownership and operation of the systems.

Although new electricity supply was provided to more than 90,000 households, exceeding targets, most projects were on-grid extension and diesel systems for off-grid rather than renewables.

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[7]A revolving fund is usually seeded by a combination of grants and debt financing. Usually the costs of the funds are the purchase of new systems and the provision of the credit service, while the revenues come from customers' repayments under the lease or rental arrangements.

[8]A Case Study on Rural Electrification in Chile, www.worldbank.org/html/fpd/esmap/energy_report2000/ch9.pdf

A similar model has also been found in China to finance energy services in rural areas. Apart from the government controlling the financial model, market elements are included in the policy options. In 2001, the Chinese government launched a village power programme, to install 700 village power systems with central and local government financial inputs.

In this model, the government is the financial agency with the installation company and the local service company playing a crucial role for supplying energy services in rural areas.

Although mostly successful and including some private sector involvement, it must be clear that the above described models depend highly on continuing government support.

5.2. Market-based models

Due to the perceived high risk and low return on investment for RE and EE projects, few success stories using a market-based model are available. However, international aid agencies have been developing several market-based business models, especially for rural electrification programmes.

To become economically viable with less or ultimately no governmental or donor support, RE and EE projects should strive to get embedded in conventional economic activity, by integrating more private actors in the process, by gradually increasing income through the delivery of energy services and the differentiation of the client base.

There is a need for innovative instruments for households with limited cash to overcome the high initial investment costs. These instruments aim to increase affordability for users by spreading the repayment of the capital costs over longer periods and by reducing the initial payment, and to provide a framework for private initiatives to design and offer their services. Examples include the consumer finance, leasing and fee-for-service model,[9] which will be discussed below. These models have mainly been developed and used for solar home systems, but the same principles can be applied to other technologies and target groups.

Consumer finance

The consumer financing (CF) approach implies consumers purchase their system from a dealer on credit by making a down payment and financing the balance

[9]ESMAP, www.esmap.org

with a loan, making periodic payments of capital and interest. The customer gets (gradual) ownership of the system. The loan plan is generally funded by a separate, small-scale and unregulated financial institution.

Successful programmes have kept the down payment at or below 25-30 per cent of the cash cost. By maintaining a high volume of installations, dealers can also reduce the price because fixed costs are spread over a larger number of units. The flexibility of interest rates is limited. Sustainable CF programmes can only reduce rates by seeking affordable financing, controlling operating costs, minimizing loan defaults, and ensuring timely recovery of capital and interest.[10] Finally, adequate after sales service and end-user education are important since they prevent poor system performance and therefore maintain cost recovery and achieve financial stability.

The main advantage of this approach is the increased affordability because the end-user can spread out the repayment of the high initial cost.

The key issues to consider are:

- Creditworthiness of the customer;
- Creditworthiness of the financial institution;
- System quality and warranties provided by the dealer;
- Clear and contractual arrangements between the dealer and the financial institution(s).

Leasing

In the leasing model, the leasing company procures systems on a wholesale basis, and then offers them to households through retail lease agreements. In contrast to the CF approach, the leasing company retains ownership of the system, although it is often gradually transferred to the customer. The leasing company usually is a dealer or a related financial or development institution. The payments from the customer cover the equipment costs of the leasing company minus a slight residual value, interest costs and a return on capital.[11] Most programmes also allow the customer to purchase the system when the lease expires.

The main advantages of this model are the increased affordability for households thanks to the leasing option and the decreased transaction costs. Since the

[10] *Financing Renewable Energy Projects—a guide for development workers,* IT Power and the Stockholm Environment Institute, 1997

[11] Leasing to Support Small and Micro Enterprises, World Bank, 1997.

leasing company retains ownership of the system, it may be easier for the leasing company than in the case of consumer financing to secure capital and to disconnect delinquent customers.

The key challenges are the achievement of financial stability, since lease lives are typically longer than consumer loan lives. Robust cash flow management is essential, and will be more complex and expensive than under CF.

Fee-for-service or ESCO

A fee-for-service approach, also known as an energy service company (ESCO) model, seems to offer rural households the best prospect for widespread access to sustainable energy services. ESCOs intervene in two aspects of the financing structure: first, in downsizing the high initial costs of systems by offering a staggered payment and fee for service models; second, in serving as financial intermediaries in consumer bank loan procurements and guarantees for securing loans. This form of intervention induces a reduction in risk perception in the banking sector, enables consumer access to bank lending and enhances sales for manufacturers and suppliers of equipment.

The main advantages of this approach are:

- Simplicity: the customer signs a contract with a service provider for the installation, maintenance and repairs of the system, and agrees to make periodic payments in return;
- Flexibility for customer and service provider: since the customer never takes ownership of the system, the service provider can simply remove the system and transfer it to another customer if the customer no longer wants to pay for the service;
- Affordability: since the investment can be recovered over the life of the system, the periodic payments and the transaction costs are lower than for the alternative models, and unexpected large-scale expenses for major components or repairs are avoided

The key challenges lie in the more complex management requirements, due to the large amount of customers necessary to make the business viable and the long cost recovery periods.

The leasing and ESCO approach have been successfully applied by private commercial actors in Honduras and the Dominican Republic (by Soluz),[12] in India, Sri Lanka and Vietnam (by SELCO)[13] and E&Co.[14]

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[12]www.soluzusa.com/redcos

[13]www.selco-intl.com/where-we-operate.html

[14]www.eandco.net

Private participation for increasing energy services for rural areas has also successfully worked for small hydro power (SHP) in China. SHP development initially requires a large investment in construction, but is a cost effective option in the long term. The programme stimulated private financing in China's SHP development by allowing investors from multiple levels and areas to gain by investing in SHP, in line with the principle "who invests, who owns, who benefits". Moreover shareholding and cooperative systems have proven to be very effective in attracting funds. The programme is finally assisted by (decreasing) government support and (increasing) bank loans.

The above mentioned examples and variants are described in more detail in module 11: Increasing energy access in rural areas.

Box 1: A case of micro financing in South Africa: solar home systems, school and clinic electrification system, water pumping

The solar home system (SHS) programme was part of a larger energy services development project in South Africa.

An energy committee was established to handle installation, sales and maintenance of SHS. Decisions regarding financing options for the SHS were made in consultation directly with the community. A small community-based organization was set up to market the SHS and also provide assistance for the processing of loans.

The South African company Solar Engineering Services (SES) assisted with quality monitoring, preparation of marketing materials, and project management and provided training for installation technicians under contract to SELF.

Financing components:

- To finance the SHS, KwaZulu Financing and Investment Corporation (KFC) provided community loan financing to buyers over three to four years at commercial interest rates. The US Department of Energy provides guarantees for this loan funding.
- A small community-based cooperative took responsibility for marketing SHS, purchasing SHS directly from the supplier, and also providing assistance for the processing of loans.
- The SHSs were imported and sold to households for between R 2500 and R 3000 at a repayment rate of R57 to R82 per month. The SHS were guaranteed for the period of the loan (replacement is subject to payments being up-to-date).

- The South Africa Department of Minerals and Energy provided a partial contribution to project management costs and financial support for project demonstration.
- The Solar Electric Light Fund (SELF), being the programme initiator, provided a portion of the project management funding as well as experience and expertise.
- The South African Government provided core start-up grants to cover project management and project demonstration. Loan guarantees were provided by the US Department of Energy.

This project is generally regarded as a success, mainly based on the fact that the overhead costs for training, supervision, travel, marketing, financing, quality control could be shared over the large number of projects.

Source: db.sparknet.info

An illustration of a combination of consumer finance by microfinancing institutes and the ESCO approach is presented in the section 9.1 "Sri Lanka Energy Services Delivery Project" of this module.

ESCO for EE project funding

The ESCO model also works for EE projects. Being especially known in the United Kingdom, the United States and in some developing countries, ESCOs represent a relatively new means of funding EE capital investments for many parts of the developing world.

An ESCO essentially is a company that helps an enterprise to identify suitable EE projects and assists in project design, equipment selection, project implementation and post-commissioning testing to verify savings.

ESCOs primarily focus on industries whose energy costs represent a relatively high proportion of manufacturing expenses and as such have a strong interest in reducing energy costs. ESCOs aim to activate the savings potential through the use of proven technologies and look for high value projects with a short pay back and a high replication potential. For example, hotels and chicken factories may offer relatively easy savings opportunities for lighting projects, with quick installation and short pay back times, whereas more complex steel mill projects can take much longer to implement and require much greater ESCO administrative costs.

The ESCO will provide funds (all or part) and agree with the host company on terms of repayment. Usually these take the form of profit sharing, so the host company has a minimum of funds to find itself and repays the ESCO out of the savings achieved. The repayment terms will include an element of profit to the ESCO. After repayment has been completed, the host company can continue to save on energy costs for years to come. Other forms of contract are also used, such as equipment leasing.

The key issue for a successful ESCO business is the proper management of risk. There are often a variety of low risk EE investments available in a country and an ESCO (and potential host companies) should avoid high risk and high cost investments. Low risk investments can be highly profitable to the ESCO and the host.

Probably the most obvious example is the improvement of lighting and lamps in hotels, offices and industrial buildings, usually with a major replication potential in similar facilities such as commercial centres, hospitals and schools. Several industries offer savings potential in terms of transformer retrofitting, electric motor and boiler combustion efficiency improvements, power factor correction at motors, insulation packages and waste heat recovery systems.

Box 2: The People's Republic of China, energy service company project finance fund

ESCOs are a growing industry in the People's Republic of China (PRC), where they are known as energy management companies (EMCs), supported in part by the World Bank and PRC government development programmes and other market trends. Many ESCOs have been formed in the PRC, but are constrained by a lack of equity and project finance.

This opportunity is being addressed by the Noble Group: a substantial Hong Kong listed company with approximately $4 billion in market capitalization and a $US 12 billion annual turnover. Noble has partnered with the United States' ESCO finance company, Energy Performance Services (EPS), to form a new company to finance EMC projects in the PRC by purchasing project assets and revenue streams. In addition to the pipeline of projects being developed by the PRC's EMCs, Noble may generate project deal flow from its existing trade relationships with multiple Chinese industries which are good targets for EE investment.

The Asian Development Bank (ADB) considers investment in this initiative and the possible tools being considered are:

- Equity investment in the new Noble EPS Capital entity, proceeds of which will be used exclusively for the equity component of EE project finance (not working capital);

- Partial credit guarantee, supporting project finance loans from local financial institutions. Technical assistance (TA) tools that would help Noble EPS to develop projects and build capacities of its ESCO investees are also possible.

This type of opportunity could be developed in other countries as their ESCO industries develop. ADB TA programmes to develop ESCO industries could be followed by such an investment.

Source: Report of the Energy Efficiency Initiative, March 2006, www.adb.org

Review question

Name two financing models for RE or EE project funding and give an example for each of them.

6. EXISTING POLICIES AND REGULATIONS

Private investment occurs when investors can recover the investment made over a reasonable period of time with a profit. Since the financial sector perceives RE and EE projects as involving high risks, high transaction costs and often low returns, there is a need for specific policy intervention to stimulate private sector investment and financing by financial institutions.

The major policy instruments to stimulate financial institutions to play a greater role in RE and EE projects have focused on decreasing the investment costs for project developers and investors, by adopting tax and subsidy schemes favouring RE and EE projects, and more sophisticated market-based support instruments such as quota and feed-in systems. Furthermore multilateral and regional development banks are dedicating specific funds to clean energy investments. These will be described in detail below.

6.1. Fiscal measures

Taxes and tariffs on the one hand can be imposed on specific market actors, e.g. electricity suppliers or grid operators, sourcing development funds which then are used to finance RE and EE projects directly, in the form of instance subsidies, or to provide the funds for the operation of a regulator, or for infrastructure and planning studies.

Fiscal measures on the other hand can be applied to stimulate investments; acting in much the same way as subsidies by decreasing investment costs for project developers, investors and end-users.

The government can allow companies to deduct a percentage of RE or EE investments from their taxable profit.

The same can be applied for end-users with tax breaks when purchasing equipment. Examples include tax breaks for PV and solar water heating systems, heat pumps, double-glazing, insulation, and for more energy efficient electric devices such as refrigerators, washing machines and lighting.

Green taxation

There is a tendency in several European countries to restructure the existing tax system to shift classic forms of taxation towards taxation based on environmental performance. For instance, cars would be taxed based on their emissions (g CO_2 per km) rather than on the horsepower or cylinder content.

6.2. Subsidies

Direct subsidies are often applied by governments and regulators to make investments more attractive to project developers and investors. They are often used as the first economic incentive to trigger the development of new markets, and once the markets become more mature and self-sustaining, the subsidy levels decrease over time or they are replaced with market-based instruments.

It is important for both subsidy and tax schemes to be embedded in a clear and longer term framework in order for project developers and investors to be able to plan their investments and to avoid being faced with sudden changes.

6.3. Market-based instruments

Quota and feed-in systems

Two main types of government policy instruments have been initiated in recent years to create incentives for investment in RE projects: those in which the government guarantees prices or provides a fixed level of subsidy and the market determines the quantity of renewable energy supplied (e.g. feed-in tariff systems); and those where the government guarantees or mandates a given market share or quantity of renewable energy and the market sets the price (e.g. renewable obligation, renewable portfolio standard, mandated market share). Feed-in systems and similar pricing policies were adopted in Austria, Brazil, Canada, China, France, Germany, South Africa, Spain, and Switzerland. Quota systems were introduced in Belgium, Italy, Sweden, United Kingdom and some of the United States.

As for EE, target setting instruments for energy efficiency were developed, including public service obligations for distribution companies, the EU Emissions Trading System, voluntary agreements with industries and the use of white certificates.

For a detailed description of these instruments see modules 10: Regulatory and Policy Options to Encourage Development Of Renewable Energy and 17: Regulation and Policy Options to Encourage Energy Efficiency.

Clean development mechanism

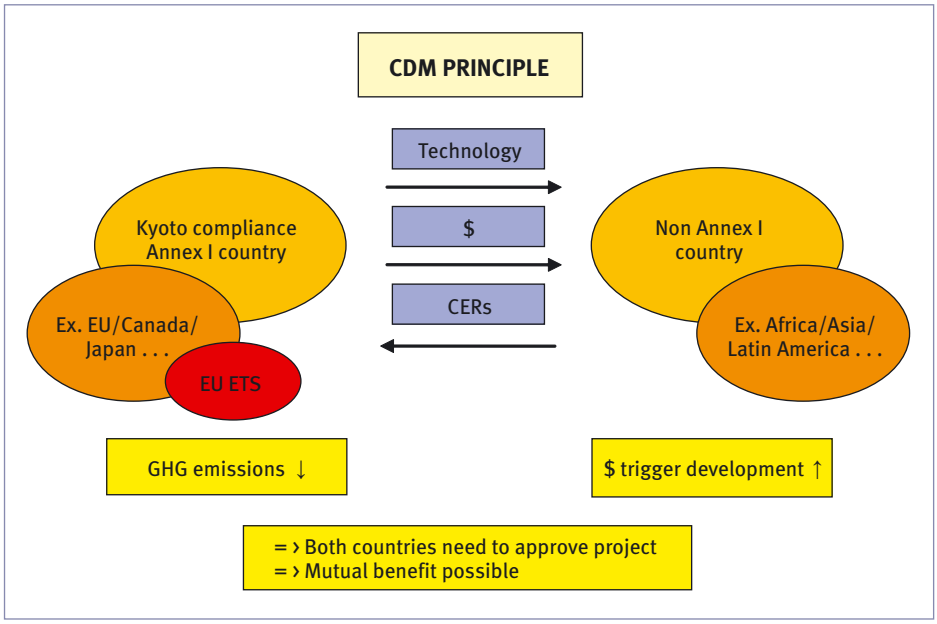
In addition to renewable portfolio standards (RPS) and renewable energy feed-in tariff laws, the Clean Development Mechanism (CDM) under the Kyoto Protocol to the United Nations Convention on Climate Change (UNFCCC) is considered to

be an instrument that can open the door to new opportunities for private sector finance in RE and EE projects. CDM allows industrialized countries with a green-house gas reduction commitment (so-called Annex II countries) to invest in emission reducing projects in developing countries as an alternative to what is generally considered more costly emission reductions in their own countries. The CDM is supervised by the CDM Executive Board (CDM EB) and is under the guidance of the Conference of the Parties (COP/MOP) of the UNFCCC.[15]

Approved CDM projects produce Certified Emission Reductions (CERs), which can be traded with businesses, industries, or countries that are not meeting their own CO_2 emission targets nationally.

Although CDM through the income of CERs is not likely to be a key investment driver, it is capable of acting as a catalyst in increasing return on investment, thus providing projects more credibility and facilitating the securing of funds from financial institutions.

Figure III. CDM principle



There is a need though to streamline CDM within country policies and financial instruments. Moreover, and of particular interest for African countries, the further development of innovative solutions like programmatic and unilateral CDM

[15]www.unfccc.org

are expected to address issues, such as the lack of financial resources and infrastructure and the high transaction costs for small-scale projects.

Experiences in Latin America show that such constraints can be overcome through both regional cooperation and active policy support by governments.[16]

6.4. Energy audits and feasibility studies

The lack of RE and EE investments is partly due to the limited information on specific energy consumption data in a given organization and a lack of awareness of the technical solutions available. Energy audits are conducted by energy experts for any industrial, office or household environment and result in a suggested ranking of the main energy savings measures and renewable energy investments that can be taken to reduce energy bills, based on technical and economical criteria.

To increase awareness and activate this potential, energy audits are often funded or even offered free by governments and public agencies, especially for small-scale enterprises and households, which often have a limited understanding of their energy consumption profile. In other cases, energy conservation laws impose the mandatory use of energy audits for specific sectors.

Once an audit has pointed out the main sources of energy consumption in the organization and measures are suggested, a feasibility study is conducted to provide a detailed insight in the pros and cons of a considered measure. Feasibility studies are generally carried out for measures requiring substantial investments and a revision of the technical and organizational set-up.

The feasibility study evaluates the likely costs and benefits of the proposed project and helps to justify both company funds and investments from local, national or international banks or institutions.

A typical feasibility study includes a summary of the proposed budget, an estimate of the rate of return for the investment (presenting the expected cash flows and how the enterprise expects to repay any lending institution involved) and a sensitivity analysis to determine how possible changes for key parameters could affect the rate of return.

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[16]Workshop on Mainstreaming Policies and Investment in Low Carbon: opportunities for new approaches to investment and flexible mechanisms, ESCAP, Bangkok, August 2006.

6.5. Institutional finance

Rather than provide direct support to projects, this policy option consists of creating a financial institute with the specific purpose of investing and funding RE and EE projects, and attracting and channelling funds from various sources into RE and EE sector development. Being capital intensive, the success of RE projects often depends on access to start-up and expansion capital. As a lack of focus for creating an investor-friendly atmosphere to invest in RE technologies is a major barrier for RE and EE technology development in Africa, the creation of this type of institutional finance is often essential for direct incentives such as subsidies and tax breaks to be effective.

Box 3: National resource example: Indian Renewable Energy Development Agency

A dedicated financial institution, such as the Indian Renewable Energy Development Agency (IREDA), can provide both technical guidance and suitable financing to project developers. In addition, IREDA acts as a nodal agency in RE sector financing and is effective in attracting funds from multilateral/bilateral agencies. Special purpose financial institutions for RE operate through instruments such as capital finance, debt and equity finance, lease finance or lending through financial intermediaries. The lending instruments should be able to respond to the needs of various actors involved in the financing of RE. The experience of IREDA in India indicates that such an institution can create confidence in investors and attract funds from multilateral and bilateral institutions. The policy is expected to increase the capital for RE projects and markets, increase manufacturing and after sales service, and ultimately change the perception of mainstream financial institutions that are reluctant to invest in the RE sector. The viability of special purpose financial institutions in the long term is an important issue. In particular, it is necessary to formulate an exit strategy when the market situation is dynamic and other financial institutions start operating in RE sector financing. The exit time is essential for maintaining the primary objective of a special purpose institution, which is to be a front-runner in driving private sector finance—and not a replacement for it.[17, 18]

Some Indian states have RE or EE development agencies, such as the Punjab Renewable Energy Development Agency and the Maharashtra Energy Development Agency. Such entities could be sponsors and borrowers of sub-sovereign public sector loans. They would on-lend their funds as debt and project finance to RE and EE projects, using various financial structures.

Source: www.iredaltd.com

[17]Structuring RE&EE Projects and Risk Assessment for Investment and Financing—Training for African Development Bank.

[18]Indian Renewable Energy Development Agency Ltd, www.iredaltd.com

It seems quite clear that in the coming years the multilateral and regional development banks will have a key role to play in mobilizing private sector participation through their investment frameworks. Representatives of both private sector and development banks will discuss specific issues and opportunities for enhancing private sector financing, outcomes being expected at the International Gleneagles Dialogue on climate change in September 2007.[19]

Several regional development banks have recently been starting up specific funds and initiatives in order to increase investment in RE and EE projects.

Asian Development Bank (ADB): the energy efficiency initiative

The ADB recently set up the Asia-Pacific Fund for Energy Efficiency (APFEE) as a vehicle to mobilize donor resources to blend with the ADB's clean energy investments. The target fund size is US$ 500 million for the period 2008-2010.[20] The key features of this fund are threefold:[21]

- Activate local finance and mitigate risk: the ADB will provide guarantees and associated funding lines to local EE finance partners for up to 50 per cent of commercial risk and 100 per cent of political risk for eligible EE projects (50 per cent of fund). The rationale is to activate local resources into EE projects and catalyze future investments;
- Access to technology: grants and concessional loans will be provided to finance the additional cost for EE technology. Options include zero or low-interest loans for EE projects, EE equipment production and start-up energy service companies (ESCOs) (35 per cent of fund);
- Capacity-building: provide technical assistance and capacity-building for local partner financial institutions, awareness-raising, etc. (15 per cent of fund).

The Energy Efficiency Initiative (EEI), which was launched in July 2005, is currently in Phase II, where medium-term investment and action plans are being developed.

The target of EE investments covers many diverse and distinct market segments, including investments in energy generation, delivery and end-use equipment, facilities, buildings and infrastructures which deliver higher useful energy outputs or services. The initiative expects to cover both small-sized, widely distributed EE projects, and a small number of high-impact large interventions that will help

[19]Press release of Financing Clean Energy: A framework for public-private partnership to address climate change, March 2007, www.ebrd.com

[20]Report of the Energy Efficiency Initiative, March 2006, www.adb.org

[21]ADB presentation at UN ESCAP workshop "Mainstreaming Policies and Investments in Low Carbon", Bangkok, August 2006.

establish EE technologies for the next decade. Since the small-sized projects are expected to be numerous, the key challenge will be the design of a suitable management system, with an extremely low transaction cost for loan approval balanced by an effective mechanism for the monitoring and evaluation of results during project implementation and operation (the actual period of energy saving).

The Regional Renewable Energy and Greenhouse Gas Abatement Equity Investment Fund would invest in local clean energy sub-funds, which would be managed by professional fund managers who then would invest corporate and project equity in sustainable energy companies and projects. The regional Clean Energy funds set up by the ADB are summarized in table 1.

Examples of the type of projects being supported by the EEI are given in box 4.

Table 1. Summary of proposed ADB Clean Energy funds

Fund name	Purpose	Main investment modalities	Proposed amount
Asia-Pacific Fund for Energy Efficiency	Support and facilitate investments in EE projects through risk mitigation, increasing access to EE technology and capacity building	Partial credit guarantees; below-market loans and subordinated loans; TA grants	$25 million from ADB; up to $500 million total fund size
Regional Renewable Energy and GHG Abatement Equity Investment Fund	Provide and mobilize equity investments for RE and EE companies and projects	Equity investment in a series of sub-funds, which, in turn will make equity investments in EE and RE projects and companies	$100 million from ADB; maximum investment of 25 per cent in each sub-fund; related TA facility would help prepare investments and build capacities of investee companies
Carbon Market Initiative	Provide financing for qualified EE, RE and GHG abatement projects;support preparation of projects for investment	Purchase CERs and other GHG emissions reduction units generated by qualified projects; the CMI fund could pay up-front for CER deliveries over time, bridging certain delivery and performance risks, so carbon sale can play a greater role in project finance plans; provide TA support	$150-200 million

Source: Report of the Energy Efficiency Initiative, March 2006.

Key:

CER= Certified Emission Reductions, CMI=Carbon Market Initiative, EE=Energy Efficiency. GHG=Greenhouse Gas, RE=Renewable Energy, TA=Technical Assistance.

Box 4: The Asian Development Bank's Energy Efficiency Initiative: investment concepts and examples

India: Commercial Bank Partial Credit Guarantee for Energy Efficiency Projects Loans

Partial credit guarantees (PCGs)[22] can be offered to local commercial banks to support their lending in target EE sectors. The PCGs would mobilize liquidity in local financial institutions (FIs) by sharing in the credit risk of EE sub-loans from banks who would make loans with their own resources. This structure would build on the recent experience of the ADB's Private Sector Operations Department (PSOD) with a similar small and medium-enterprise (SME) PCG programme in Pakistan. The PCG helps overcome credit risk barriers and expand access to lending to SMEs, industries and energy service companies (ESCOs). In India for example, a large potential for industrial EE has been identified. ADB's South Asia Department (SARD) and PSOD have prepared a study of India's EE market and recommended industrial EE measures.

This would be a private sector investment. Credit risk barriers are a common problem and the PCG instruments could have a broad application. For example, Thailand has also expressed strong interest in a PCG programme. Thailand has an existing Energy Conservation Fund (ECF), with balances of $500 million accrued from oil levies; some ECF funds are being lent on to commercial banks at below market rates for lending to EE projects. A PCG, coupled with bank training on EE finance, and possibly also other TA to help develop EE projects, could expand this programme.

The People's Republic of China (PRC): Electric Utility Power Plant Rehabilitation and Modernization Investment Programme

The PRC's State Power Economic Research Centre has identified 20 GW of small (less than 50 MW) old coal power stations and estimates that 5 GW should be decommissioned. It would be economic to rehabilitate and upgrade the remaining 10 to 15 GW to include cogeneration. These projects have the potential for large efficiency gains and are a government priority.

This rehabilitation project could be a public sector investment and has large potential for replication around the region, not only for thermal plants, but also for small hydropower plants. For example, an ADB public sector investment currently under preparation to India's Power Finance Corporation includes funding for the renovation and modernization of several small hydropower plants as well as the rehabilitation of existing transmission and distribution systems, which, among other goals, will reduce system losses.

Source: Report of the Energy Efficiency Initiative, Appendix 8, March 2006.

[22]A partial credit guarantee represents a promise of full and timely debt service payment up to a predetermined amount. Typically, the sum that IFC pays out under the guarantee covers creditors irrespective of the cause of default. The guarantee amount may vary over the life of the transaction based on the borrower's expected cash flows and creditors' concerns regarding the stability of these cash flows. www.ifc.org

European Bank for Reconstruction and Development: the Sustainable Energy Initiative

The European Bank for Reconstruction and Development (EBRD), focusing on economies in transition throughout Eastern Europe and the former Soviet Union, launched its Sustainable Energy Initiative in May 2006, aiming to achieve investments in sustainable energy to €1.5 billion in the period 2006-2008.

The initiative essentially works through Sustainable Energy Financing Facilities (SEFFs), which are credit lines or guarantees provided by the EBRD to local banks. Those local partner banks then on-lend the funds to borrowers undertaking sustainable energy projects in the corporate, municipal and residential sectors.[23]

Alongside the credit line or guarantee, technical consultants funded by donors will be engaged to assist prospective borrowers in preparing energy efficiency or renewable energy projects.

Targeted investments in the private sector include cogeneration, heat and steam recovery, automation and control systems, upgrade and replacement of utilities, fuel switching (coal/mazut fuel oil to gas), process optimization and renewable energy investments.

The investment in industrial energy efficiency and renewable energy implies a significant input from private sector financing as EBRD financing does not generally exceed a third of the total project cost. Private sector financing can come from strategic investors or local corporate entities, and from foreign or local banks or funds, which will be co-financing projects alongside the EBRD.[24]

The rationale behind the Initiative is not to subsidize projects that would not be otherwise bankable, but to provide the necessary grant funding to both scale-up and accelerate the pace of sustainable energy investment in order to address a broad range of barriers which currently affect the behaviour of sponsors, borrowers, banks and investors. These barriers include:

- Lack of awareness on technologies and the cost of various investment options over their life-cycle (i.e., taking into account up-front capital and subsequent operating costs);
- Institutional and organizational gaps, such as lack of skills, and capacity to identify, appraise and implement energy-saving measures and investments; regulatory incentives and uncertainty—many investments in this area,

[23]Sustainable Energy Financing Facilities: Working through the Financial Sector, www.ebrd.com
[24]Sustainable Energy Initiative Summary Document, July 2006, www.ebrd.com

particularly in the power sector, require a long time frame and some are discouraged by prevailing regulatory arrangements (e.g., grid access, cost-plus regulation);

- High transaction costs, particularly for small projects; and the fact that environmental "externalities" such as the emission of greenhouse gases and other pollutants are not reflected in the energy price.

In 2006 around 750 million euro was signed under the SEI. In line with the characteristics and issues of the region covered by EBRD the vast majority of projects (90 per cent) funded were energy efficiency projects.[25]

International Finance Corporation

The International Finance Corporation (IFC) is developing a similar programme with gas distribution utilities in China, which will provide project development, implementation and financing programmes to energy users to implement EE and gas-using projects.

Similarly to the ADB programme, the selected EE projects will be financed by local banks and supported by a partial credit guarantee from IFC.

Hybrid programmes are possible, combining public sector investment with utility and private sector investment.[26]

IFC also runs the US$ 100 million Renewable Energy and Energy Efficiency Fund (REEF), which is designed to invest in private sector projects.[27]

African Development Bank

The African Development Bank (AfDB) currently runs several sustainable energy programmes, most notably the Financing Energy Services for Small-Scale Energy Users programme (FINESSE) and the Clean Energy Investment Framework.

The FINESSE programme aims to assist African countries in setting up policy and regulatory frameworks for RE and EE, and to increase the capacity of AfDB staff to deal with the specific nature of RE and EE projects, and to mainstream RE and EE projects into normal AfDB activities.[28]

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[25]Personal communication with EBRD

[26]Report of the Energy Efficiency Initiative, March 2006, www.adb.org

[27]www.ifc.org

[28]finesse-africa.org

The Clean Energy Investment Framework was initiated in July 2005 at the G8 Gleneagles meeting, and is currently being set up by the World Bank and regional development banks, and essentially aims to shift a growing share of investments in the energy sector towards cleaner or more efficient energy technologies. The framework is expected to be fully operational by 2008.

Within the Clean Energy Investment Framework, the AfDB is designing its own plan of action taking into account issues that are particularly important for African countries, notably the increasing vulnerability of ecosystems, societies and economies to environmental and climate risks. Therefore the approach will not only have to facilitate the transfer of finance and technology, but also improve the capacity of countries to adapt to climate change.

On the policy side, the aim is to improve the investment climate and to increase public funding facilities with tariffs and subsidies. The financial institutions are expected to expand existing risk management products in order to mainstream RE and EE finance.

New financial instruments are being considered in order to bring down the initial investment costs and to mitigate technology risks. In order to finance strategic research, venture capital funds could promote the adoption and penetration of new technologies in the market.[29]

Review question

Name different policy options that governments can adopt to decrease investment costs for RE and EE projects.

[29]Presentation on AfDB Sustainable Energy Activities, A.P. Mhlanga, www.fao.org/forestry/webview/media?mediaId=11351&langId=1

7. DESIGN ASPECTS FOR MEASURES TO ATTRACT PRIVATE INVESTMENT

Box 5: Private sector perspective

"The three most important 'deal breakers' to private investors have been found to be:

- Insufficient legal protection and framework for protection of investor rights;
- Lack of payment discipline and enforcement;
- Too few guarantees from governments or multilateral institutions."

Regulation in Africa—Investors and Operators Regulatory Concerns, Mr. T. Horvei, Chief Executive, SAD-ELEC (Pty) South Africa, Report of the Proceedings of the 2nd Annual Conference of the African Forum of Regulators (AFUR), March 2005

Key regulatory risks experienced by investors

- Weak and ever-changing regulatory frameworks;
- Right of government to override regulatory decisions;
- Lack of clarity about power of regulator;
- Regulator without necessary minimum skills, capacity and competence;
- Unilateral regulatory decisions undermining project and investment returns;
- Playing field tilted in favour of dominant industry player (most often a state-owned enterprise).

(Extract from the AFUR discussion paper "Infrastructure Investment and Regulation in Africa—Investors and Operators' Regulatory Concerns" presented at the AFUR 2nd annual conference)

7.1. Institutionalizing clean energy policies

On the institutional side, RE and EE policies and their implementation should be formalized through laws or national programmes approved by the government.

Secondly, public RE and EE agencies should be established to implement national policies, the mission being to:

- Design, implement and evaluate programmes and measures;
- Contract a range of stakeholders, such as companies, local authorities, or non-governmental agencies (NGOs);

- Ensure coordination with higher or lower levels of authorities (international, national, regional and local).[30]

7.2. Decreasing investor investment costs

The first and principal aim for policies and regulations to enhance private sector financing is to shift some of the investment costs away from the investor (e.g. to the public sector). Indeed, most of the policies and regulations described in the previous section essentially aim at reducing investment costs for project developers and investors, as do direct subsidies, tax exemptions, feed-in systems, green certificate schemes and the Clean Development Mechanisms, which all provide an additional income for the project and improve the return on investment.

The design of a set of policies and regulations to improve the profitability of RE and EE projects is not sufficient to activate the private sector though, and it should be backed by additional measures to reduce the perception of high investment/lending risks.

7.3. Increasing investor confidence

However promising the support policy and regulations for RE and EE are, the involvement of the private sector will depend highly on the perceived stability and commitment of the government in the medium and long term. Therefore the government should ideally embed long-term targets and incentives in a solid legal framework in such terms, as a guaranteed certain market size and a guaranteed certain price on any quantity delivered.

The legally provided guaranteed minimum prices for electricity from RE sources for a period of 10 years, as foreseen in feed-in tariff schemes and some green certificate systems, is an example of additional security for investors.

7.4. Decreasing investor risk

As pointed out in box 5, high risks and lack of guarantees are important barriers for the securing of financing for RE and EE projects.

This issue can be addressed by the provision of different types of guarantees from financing institutions and governments, but have to be coupled with the

[30]Report of the Energy Efficiency Initiative, March 2006, www.adb.org

development of new and innovative risk management and risk financing instruments addressing the specific nature of RE and EE investments.

The development of these tools is expected to increase insight into RE and EE project's risks, thus decreasing insecurity for private investors and improving the attractiveness of RE and EE projects.

Internally, financiers can play their part by evolving from defensive to proactive banking strategies by understanding the business case and the competitive advantage offered by RE and EE funding and by recognizing low carbon-related issues as drivers for developing new products and services, generating additional revenue and increasing market share.

Moreover financiers should ideally develop policies and guidelines for integrating environmental dimensions into the investment strategy; e.g. reflecting the cost of environmental risks in the pricing of financial and risk management products.[31]

7.5. Decreasing transaction costs

As EE and RE projects are often small and distributed across a large number of end-users, the existing procedures in both development and commercial banks involve high transaction costs for these types of projects. A major issue will therefore be to develop strategies and instruments to bring down transaction costs per project.

Especially for Clean Development Projects in Africa, it is hoped that the so-called "programmatic CDM" will address the specific issues of small-scale carbon saving projects.

7.6. Increasing awareness

Last but not least, the policy strategy should always involve an important component of information and capacity-building among key stakeholders, including local bankers and fund managers, but also transmission and distribution system operators, development and electrification agencies, and representatives from the industry.

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[31]Sustainability Banking in Africa, 2004, www.aiccafrica.org

This may consist of the adoption of legislation to support capacity-building and systemic approaches, voluntary agreements, the organization of dissemination workshops for best practices, information campaigns, and the support of energy audits and feasibility studies.

Review question

What are the corner stones of a policy strategy aiming to attract more private sector involvement?

8. LIST OF POTENTIAL DONORS AND FUNDS

The most common options to be explored as sources of finance for RE and EE projects are described below.

8.1. International multilateral funding

Funding is available through multilateral development banks such as the World Bank, the Global Environment Facility (GEF) or the European Commission. This type of formal funding in general is only accessible for governments and not for private developers and most often consists of loans at an interest rate or pay-back periods below commercial averages, and sometimes grants are applied. The large development banks also offer guarantees to mitigate the risk of the project and facilitate other forms of financing (such as loans from commercial sources). Examples include the International Bank for Reconstruction and Development (IBRD) and the International Finance Corporation (IFC).

For CDM and low carbon projects, several "Carbon Funds" were recently established, including the Prototype Carbon Fund, the Community Development Carbon Fund and the Carbon Fund for Europe.[32]

8.2. Regional development banks

Regional development banks act in much the same way as multilateral development banks, and focus on a specific continent or region. Examples of formal regional development banks include the Asian Development Bank (ADB), the African Development Bank (AfDB), the European Bank for Reconstruction and Development (EBRD), the Inter-American Development Bank (IADB), the Islamic Development Bank (IDB), the East Africa Development Bank (EADB), and the Development Bank of South Africa.

Examples of private regional development banks are the Atlantic Development Group for Latin America (ADELA) and the Private Investment Company of Asia (PICA).

[32]For a full list see carbonfinance.org

8.3. Bilateral agencies

Apart from multilateral organizations, developed countries through their development programmes often provide funding to developing countries. Examples include the Department for International Development (DFID, UK), the *Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung* and the *Gesellschaft für Technische Zusammenarbeit* (BMZ and GTZ, Germany), the Agency for International Development (USAID, USA), the International Cooperation Agency (JICA, Japan), and the Agency for International Development (AusAID, Australia).

This type of funding is generally only accessible for governments, and, due to political priorities or historical relations, often specifies preferred target regions or countries.

8.4. Government finance

In many developed countries, public funding is still the most important source of financing for RE and EE. This funding is usually provided in the form of loans or grants, and is combined with financing from multilateral and bilateral organizations.

8.5. Private sector finance

Commercial banks

Provided that a proper business plan, acceptable risks and returns on investment can be presented, commercial sources can be interested in financing RE and EE projects through loans and equity investment.

Commercial financing organizations apply market conditions in terms of pay-back periods and interest rates, thus making it harder for project developers to secure the financing, but on the other hand this form of financing is still usually more flexible than funds from multi and bilateral organizations.

Ethical banks

Some banks provide funding for sustainable projects in both industrialized and developing countries. Examples include Triodos Bank and Cooperative Bank. Most of the classic commercial banks have recently developed specific ethical products.

In 1999 the Dow Jones Sustainability Indexes were launched to provide reliable and objective benchmarks for leading sustainability-driven companies worldwide.[33]

Microfinance banks

Local communities, both in urban and rural areas, are emerging actors in the financing of clean energy, especially for the low-scale application of RE products and technologies. This trend takes the form of microfinance or community-based "green funds" as mechanisms of consumer financing.

8.6. Private foundations and charities

Private foundations include for example the Shell Foundation, an independent, grant-making charity created by Royal Dutch/Shell in June 2000, providing capital in the form of grants or soft loans for a range of socially responsible projects. Part of the Shell Foundation is the Breath Easy Kenya Fund, aiming to develop market-based solutions that get smoke out of kitchens. Concepts being tested include consumer credit and enterprise financing for cleaner fuels and more efficient stoves.

E&Co is an independent non-profit organization established in 1994 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.[34]

An overview of the different sources and types of funding are summarized in table 2.

[33]www.sustainability-index.com

[34]Sources of financing for PV-Based Rural Electrification in Developing Countries, IEA PVPS, 2004, www.iea.org

Table 2. Matrix of financing instruments

	Market-based loans	Soft loans	Grants	Equity investments	Guarantees	Technical assistance	Other
Multilateral development banks	X	X	Some	Some	X	X	
Bilateral aid	X	X	Some			X	
Funds/foundations	X	X	X	Some			
Green investment				X			X
National development funds	X	X			X	X	
Commercial loans and investment	X			X			

Source: IEA PVPS, Sources of financing for PV-Based Rural Electrification in Developing Countries, 2004

9. EXAMPLES

9.1. Sri Lanka Energy Services Delivery Project[35]

The Energy Services Delivery (ESD) project was set up in 1997 to finance renewable energy implementation in Sri Lanka. Core funding to design and build capacity for the ESD came from the World Bank's Asia Alternative Energy Unit, and the Sri Lankan Government. One of the major components of ESD was a national solar home system (SHS) promotion and implementation programme. The SHS programme involved several stakeholders and service providers at various levels. Other players included the SHS dealers and participating credit and microfinance institutions (MFIs). Financing for the SHS was provided through a loan from the World Bank that was distributed through national financial institutions and a grant provided by the Global Environment Facility (GEF) to subsidize the cost of each system. The grant reflected the environmental value of SHS over competing fossil fuel alternatives.

The Development Finance Corporation of Ceylon (DFCC) provided a monitoring programme to ensure that all systems were in fact installed, that they were installed properly and that they were functioning to specifications. The Sri Lankan government has linked its rural electrification programme to the market-based SHS programme, thus lending credibility to the private sector and increasing consumer acceptance. The government has also acted to promote the programme through legislation. It has modified standards twice, each time allowing smaller systems, better suited to consumer demand and solar insolation in the country.

The project supported the creation of a Solar Industry Association (SIA), whose members include dealers and microfinance institutions. The SIA communicates with the project, the World Bank, the government, and the national utility board on matters affecting its members. Currently, the SIA is addressing training and accreditation issues.

One of the key partnerships in the national programme was established with the Sarvodaya Shramadana Society, one of the largest NGOs in Sri Lanka with an extensive network of rural contacts. SHS financing is provided through Sarvodaya Economic Enterprise Development Services (SEEDS),[36] the NGOs finance arm, while its technical division Rural Technical Services (RTS) fulfils the role of SHS dealer.

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[35]International Financing Facilities, Training for African Development Bank, IT Power, 2006.

[36]www.seeds.lk

The distribution process is as follows:

- Photovoltaic supplier introduces customers to SEEDS;
- SEEDS complete a credit appraisal; customers sign credit agreements if accepted;
- SEEDS pays the supplier and is responsible for repayment from customers. The supplier receives 20 per cent up-front
- The supplier installs the system and forwards "Customer Acceptance Certificate" to SEEDS;
- SEEDS pays the balance of the loan to the supplier. The dealer provides technical support.

Financing mechanism

The SHS programme is executed by the Development Finance Corp. of Ceylon (DFCC) Bank of Sri Lanka. The financing has two components: US$ 19.7 million from the International Development Agency as credit and US$3.8 million in grants from GEF. The former is distributed as 10-year loans by refinancing through participating credit institutions and MFIs. Credit lines provide 80 per cent refinance with 10-year repayments. The GEF grant is used for a co-financing scheme in the form of a capital subsidy to reduce the initial cost and covers other costs, such as consultants. The GEF grant provided capital subsidy in the following amounts:

- US$ 70 for system capacities of 20-30 Wp
- US$ 100 for system capacities of 30-45 Wp
- US$ 150 for system capacities of › 45 Wp

The initial cost of a system was approximately US$ 11/Wp. As local suppliers entered the market, the price dropped to US$ 10/Wp. Initially a 30 Wp system would have cost US$ 330—and with the subsidy of US$70 (grant) it would cost US$ 260.

The three basic financing models used for dissemination are as follows:

- SHS Consumer financing by dealers: this arrangement saw credit extended by financing organizations directly to the SHS dealers. Subsequently, the dealers completed the marketing, technical support and finance management. This method was largely found to be untenable because dealers were not equipped to manage customer financing, and did not have an extensive network in the rural areas to facilitate collection and communication.
- SHS fee-for-service: This arrangement saw the dealers install SHS systems but maintain ownership, instead of collecting a monthly fee from customers.

The dealer found that the collection costs were high and that lack of ownership often translated into poor maintenance.

- Consumer financing by MFIs: under this arrangement, a project developer/dealer approaches the MFI with a project, which the MFI evaluates. If accepted, the MFI applies to the DFCC for refinancing. The MFI pays the dealer/developer for installed systems. Eighty per cent of this loan can be refinanced. The MFI designs a consumer loan package (for end-users), including an initial down payment, with monthly payments following. The benefits of this method include: freedom of dealers to focus on marketing and technical support (and not financing), freedom of private sector and NGOs, who often have extensive rural networks, to manage financing. SEEDS is an example of an MFI. The initial failures of dealer financing and fee-for-service models show that grassroots infrastructure is a significant enabling factor for successful implementation.

9.2. Kenya solar home systems—SACCO financing[37]

Muramati is a savings and credit cooperative (SACCO) for farmers in the tea sector. With a membership of over 30,000 farmers, Muramati offered the opportunity to explore expansion of the solar market and to test a rural financing scheme in Kenya.

SACCOs operate on a similar basis to credit unions and are instrumental in providing basic financial services to groups typically excluded from the conventional mainstream banking sector. In the case of Muramati, the membership consists of 15,000 farmers in the tea and coffee industry. PV systems will be installed and maintained by ASP (K) Ltd, a Kenyan solar company with over 20 years' experience in the sector, which is expanding its infrastructure into the region to service the project.

The Photovoltaic Market Transformation Initiative (PVMTI)[38] has committed a total of US$ 0.6 million in loans and grants to the project to co-finance Muramati's new programme of solar loans. Within a short span of time, the company was successful in financing installations of 180 systems. However, Muramati's operations have been fraught with challenges, ranging from adverse economic developments, component failure on early installations, difficulty in providing timely and speedy after-sales services due to geographic terrain, etc.

One of the important initiatives to address the raised issues has been to train local freelance technicians to provide maintenance services for the systems

[37]PV MTI, Newsletter August 2006, www.pvmti.com

[38]www.pvmti.com

installed in the region. Even though growth has been sluggish, Muramati has decided to mainstream PV as one of its loan products and to continue working with the local freelance PV technicians already trained under PVMTI.

9.3. Morocco—PV rural electrification programme[39]

The project encompasses the introduction by Salafin SA of a credit scheme to support sales of PV systems in rural areas of Morocco. Salafin is a subsidiary of Banque Marocaine du Commerce Extérieur, a leading Moroccan financial services group, and has established a strong reputation for the successful introduction of innovative new credit products.

The project has enabled Salafin to enter the rural credit markets by sharing the risk of this new venture and by establishing a strong partnership with Afrisol, who have the rural network essential to market the loans and to collect repayments, and other IFC-approved technical service providers. In addition to installation and maintenance of PV systems, Afrisol will assist in marketing the loans, collecting information required for credit appraisal, and collecting loan repayments.

IFC has committed a total of US$1 million as a guarantee facility and grant to support the project. The guarantee facility aims to reduce to an acceptable level the risk to Salafin of entering the fledgling market for solar loans by covering a proportion of end-user defaults.

Within the framework of this programme, some subsidy is provided, and consumers pay a monthly instalment for a period of 10 years under a fee-for-service scheme.

It is believed that rural credit markets represent an attractive potential for new business, as the majority of households cannot access financial services from mainstream banks.

The direct supply of SHS through small entrepreneurs, mostly at weekly marketplaces, is well established. Sales volumes have however reduced substantially in recent times as a result of price increases in solar modules, and the expectations of some villages of being included in the national programme for electrical grid expansion. The installed capacity of PV systems in the country was around 7 MW in 2003; it is expected to increase to around 15 MW by 2010.

[39]PV MTI, Newsletter August 2006, www.pvmti.com

9.4. Asia Regional Initiative, bagasse cogeneration[40]

There are opportunities for region-wide initiatives in target sectors that have common sustainable energy technology solutions. A good example is bagasse cogeneration, using proven technology that can typically produce thermal energy for sugar processing and power for site use and/or grid sale at a very economical cost. Bagasse is typically burnt at very low efficiencies, and has minimal alternative productive uses. The Asian Development Bank's (ADB) regional Technical Assistance (TA) to Promote Renewable Energy, Energy Efficiency and Greenhouse Gas Abatement (PREGA) programme studied these opportunities in Bangladesh, Indonesia and Viet Nam. Extrapolating those results to developing member countries (DMCs) where production of sugar cane is known, the additional capacity available from installing modern bagasse cogeneration plants would be 100 MW in Bangladesh, 500 MW in Viet Nam, 1,000 MW each in Indonesia and Philippines, 2,000 MW in Pakistan, 4,000 MW in PRC and 10,000 MW in India. Of course, developing this potential requires significant work, and for power sales, an enabling regulatory and legal framework would be necessary. Further issues exist with respect to the creditworthiness of sugar industries. The scale and breadth of the opportunity warrants exploration. Approaching the development of such projects systematically, in collaboration with respective DMC government agencies and possibly private sector project developers, could lower transaction costs, aggregate projects for development and finance, build targeted project development capacities, and accelerate their development. Other areas where such regional opportunities exist include the utilization of rice husks; waste manures from piggeries, poultry and livestock operations and municipal solid waste. Both public sector and private sector investments could be applicable in these areas, and could be coupled with the investment programmes identified above.

9.5. China's industrial state-owned enterprise energy efficiency project lending programme[41]

The People's Republic of China (PRC) Medium and Long-Term Energy Conservation Plan (January 2005), issued by the National Development and Reform Commission (NDRC) identifies EE investment in energy-intensive state-owned enterprises (SOEs), such as iron and steel, cement, petrochemicals, aluminium, pulp and paper, as a national priority. Compared with the industrial country averages, energy use per unit of production in the PRC is 21 per cent higher in steel, 45 per cent higher in cement, and 31 per cent higher in ethylene. Priority investments identified by the NDRC include *(a)* waste heat recovery power generation

[40]Report of the Energy Efficiency Initiative, March 2006, www.adb.org

[41]www.adb.org

in the cement industry, *(b)* power generation from blast furnace gas in the steel industry, *(c)* bio-mass cogeneration in the pulp and paper industries, and *(d)* motor/drive system efficiency investments in all the above. Typical individual project sizes will be US$ 10-20 million. Many EE measures have common applications within particular industries. Industry-wide applications could be designed to promote common technical solutions, and thereby reduce transaction costs. NDRC agencies responsible for EE have begun developing a pipeline of projects.

An ADB public sector investment programme could be designed to address these investment needs. The loans could be coupled with technical assistance programmes to help develop projects, and also potentially, some government capital subsidies. There is a potential application for a multitranche financing facility, as the investment programme would consist of a series of subprojects, each taking considerable time to develop, and/or sub-sovereign loans direct to the SOEs themselves, subject to credit approval. Alternatively, loan funds could be lent to commercial banks or China Development Bank for on-lending to the SOEs. The commercial banks would then bear the credit exposure. This approach would also encourage greater commercial bank EE lending experiences. ADB must analyse whether this method can offer a competitive fund cost to borrowers. Longer loan tenors facilitated by ADB funding could provide important developmental benefits to both banks and borrowers. Similar investment opportunities exist with SOEs across the region.

Discussion questions

Bearing in mind the corner stones for a strategy to increase private sector investments, analyse and discuss the current situation in your country.

Based on your experience, what are the main barriers for increased private funding? Which measures can be taken by whom to overcome these barriers?

10. CONCLUSION

The financier's perspective and approach towards RE and EE investments is based on the assessment and control of risks on the one hand, and the calculation and estimation of returns on the other. The resulting risk/return profile determines the attractiveness for the investor, highlights the remaining uncertainties and establishes the conditions for the project developer to secure the financing.

A range of funding options and combinations is available, including debt, loans, equity, grants and guarantees. Different models are available and have been tried, from models coordinated and managed by governments, with or without some form of interaction with private market players, to the ESCO models, which involve a higher degree of market participation.

A strategy aiming to attract more private sector funding should provide the following incentives:

- Lower investment costs for investors and project developers: instruments include subsidies, tax measures, feed-in or quota schemes and a use of the Clean Development Mechanism;
- Fewer risks for investors: governments and development organizations can provide guarantees, while private investors should get familiar with the specific nature of RE and EE projects in order to better assess, control and price the risks and returns;
- More investor confidence by adopting legal frameworks setting long-term targets and incentives;
- More awareness: there is a clear need for capacity-building among a range of stakeholders, including local bankers, industries, transmission system operators, electrification agencies and NGOs;
- Lower transaction costs by developing new and innovative tools to address the often small-scale nature of RE and EE projects. The first initiatives have appeared recently, introduced usually by regional development banks. When successful, these new approaches could be capable of triggering the involvement of commercial banks.

Existing and upcoming examples include rural electrification programmes, for instance in Sri Lanka and Kenya, and energy conservation programmes in the energy intensive industries of China and India.

LEARNING RESOURCES

Key points covered

This module covers the following key points:

- General understanding of how the financial sector perceives RE and EE investments;
- Different types of funding;
- Options for funding models and examples for RE and EE investments;
- Analysis of existing policies and regulations to increase RE and EE investments;
- Cornerstones of a policy strategy aiming to attract private sector capital;
- List of possible donors and fund resources.

Answers to review questions

Question: List the different types of financing and think of the (combination of) types that were used to finance a RE or EE project in your country.

Answer:

Debt

Equity

Grants and guarantees

Question: Name two financing models for RE or EE project funding and give an example for each of them.

Answer:

1. Model managed and overlooked by the government—examples are PRONASOL in Mexico, the rural electrification programme in Chile and the village power programme in China
2. Market-based models include consumer finance, leasing and the ESCO or fee-for-service model. Examples of ESCOs include Soluz in Honduras and Dominican Republic for PV, SELCO and E&Co for India, Sri Lanka and Vietnam, and the small hydropower programme and EE ESCOs in China.

Question: Name different policy options that governments can adopt to decrease investment costs for RE and EE projects.

Answer:

1. Investment subsidies
2. Tax breaks
3. Feed-in or quota/certificate systems
4. Clean Development Mechanism (CDM)—governments can stimulate and assist sectors to take part in the CDM process

Question: What are the cornerstones in a policy strategy aiming to attract more private sector involvement?

Answer:

1. Institutionalize RE and EE policies
2. Decrease investment costs
3. Decrease investor risks
4. Decrease transaction costs
5. Increase investor confidence
6. Increase awareness

Exercise

After having read the text below answer and discuss the following questions:

- What were the critical issues to the success of this community energy project?
- What part did financing play in making this project a success?
- What lessons can be drawn from this case study for future investment models?

Write a 2-3 page essay answering these questions.

Microhydro for community projects, Mburiri Village, Kenya—an example of effective community participation in a RE and EE project

The project involved diverting flow from the Tungu River through a microhydro plant that provides electricity for an enterprise centre (a new building housing local enterprise). The Tungu-Kabiri Community Micro Hydropower Project was formed to own and operate the microhydro scheme. Shares in the project were issued to local residents in return for cash and/or labour. The organization sets its own tariff which it charges the centre.

The objectives were to improve livelihoods and to provide communities with energy for commercial activities. At present, the energy is distributed only to the Enterprise Centre as power is only allowed to be distributed to households by the Kenya Power and Lighting Company—the national utility. Implementation was undertaken by the Ministry of Energy (Dept. of Renewable Energy) and the Intermediate Technology Development Group (ITDG-East Africa), with funding support from UNDP-GEF. The project was part of a national project to assess the potential of micro-hydro power. The village of Mbuiru was selected from a list of candidate project sites based on predetermined characteristics. Core funding was provided from the UNDP-GEF small grants programme.

Extensive support was provided by the community during the consultation process. Local labourers donated one day per week to the construction of the facility.

Financing mechanism

The community raised funds to acquire land, donated materials and labour to the project, and paid cash for required licences and shipping of materials to the community. Two hundred community members each bought US$ 50 shares in the micro enterprise. ITDG provided advice to the enterprise regarding implementation of tariffs for the use of power and rent for the use of stalls in the micro-enterprise centre. The community has complete ownership of the facility. ITDG secured funding from the UNDP-GEF small grants programme (US$ 63,700) and other donors, as well as providing technical expertise. Government support was also provided (both technical and other assistance) by the Ministries of Energy, Land, Water, as well as the Social Service Department and the local government authority.

Presentation

Presentation: Finance—Module 20: Financing Options for Renewable Energy and Energy Efficiency

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African Institute of Corporate Citizenship, Sustainability Banking in Africa, 2004, www.aiccafrica.org

INTERNET RESOURCES

World Bank, Carbon Finance Unit: carbonfinance.org

Asian Development Bank: www.adb.org

Multilateral Investment Guarantee Agency (MIGA): www.miga.org

Rural Energy Enterprise Development (REED): www.uneptie.org/energy/projects/REED, www.areed.org

European Bank for Reconstruction and Development: www.ebrd.org

World Bank Group, International Finance Corporation: www.ifc.org

African Development Bank, www.afdb.org

GLOSSARY/DEFINITION OF KEY CONCEPTS

Energy efficiency	Energy efficiency investments are defined as economic investments in energy generation, delivery and end-use equipment, facilities, buildings, and infrastructure that deliver higher useful energy outputs or services (e.g., lighting, heating, refrigeration, pumped water). Market segments include: supply-side efficiency in generation, transmission and distribution; industrial energy efficiency, including changes in production technology; building end-use efficiency in commercial, governmental and residential sectors; municipal infrastructure (street lighting, water, waste and sewage); transport efficiency, including urban mass transit; bio-fuel use to substitute for fossil fuels; irrigation (e.g., efficient pumps, foot valves and piping); and equipment/appliance standards.
Energy service company (ESCO)	An ESCO is a company offering to reduce a client's energy costs by implementing measures, which reduce energy consumption and costs in a technically and financially viable manner. The cost savings are usually split with the client through an energy performance contract or a shared-savings agreement.
Equity investment	The buying and holding of shares of stock on a stock market by individuals and funds, in anticipation of income from dividends and/or capital gain as the value of the stock rises. It also sometimes refers to the acquisition of equity (ownership) participation in a private (unlisted) company. When the investment is in infant companies, it is called venture capital investment, which in general means to be higher risk than investment in listed companies.

Financing	The process of gathering funds through grants, loans, equity investment or other means.
Renewable energy sources	Renewable non-fossil and non-nuclear energy sources, including wind, solar, geothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases.

ANNEX I. SCREENING ENERGY EFFICIENCY PROJECTS USING FINANCIAL AND ECONOMIC RATES OF RETURN

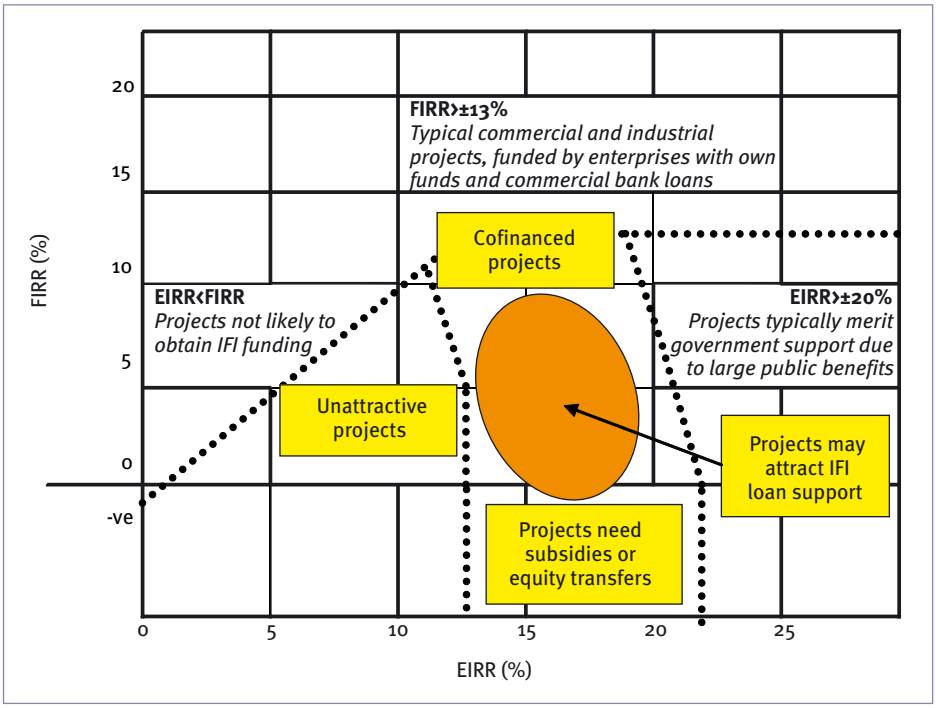
Criteria for screening EE projects

Enterprises will have their own procedures for evaluating potential investment projects and these will typically be focused on the financial internal rate of return (FIRR) for a project. This is the return that an enterprise will expect, based on capital expenditures and on the value of energy savings achievable. Items such as improved environmental emissions will not normally be included in the calculation. If these environmental benefits are included—and this is not always easy to do—then an economic internal rate of return (EIRR) can be computed to reflect the return to society as a whole.

Most companies will set a lowest allowable FIRR based on their cost of capital (broadly speaking, the interest rate payable to borrow money). If a project FIRR is greater than the lowest limit, the project will be looked upon favorably by management. Provided funds are available, the project would normally be implemented. However, even for projects with a low FIRR, the EIRR may be large enough to persuade an international financial institution (IFI, such as the World Bank) to lend money because the overall benefits to society are good.

Figure I compares the EIRR and FIRR for projects and suggests an "area" where a project might be supported by an IFI.

Figure I. Funding possibilities for projects with low FIRR



In summary, the figure indicates those projects with high FIRR (above say 13 per cent, for discussion purposes, typically industrial or commercial projects) will attract funding by the enterprise or utility itself, depending on other investments competing for funds. For projects with FIRR below 13 per cent, the EIRR needs to be evaluated. Where potential projects have an EIRR less than their FIRR, it is very unlikely that these can justify any funding support, by IFIs or anyone else. These projects are to the left of the dotted diagonal line.

Although some projects may have a modest FIRR (say less than 13 per cent) they could have large public benefits and their EIRRs will therefore be high. Those projects with high EIRR's could attract government support to achieve the public benefits through project implementation, and lie to the right of the "frontier" illustrated as a dashed line in the exhibit.

Projects to the left of this frontier line will have moderate FIRR values and lower EIRRs. Those projects with relatively high FIRRs (but not high enough to be funded by private sources) may be funded through co-financing to reduce non-project risks and to reduce repayment risks to individual lenders. If several lenders are willing to back a project, it provides a signal that key political factions are supportive. Co-financing appears to be an important element of many loan guarantees because it signals that the enterprise, local authorities and provincial authorities support the project and will do what they can to make the project a success.

Projects with very poor FIRR but attractive EIRR (for example, a hazardous waste facility that is a public service but is barely profitable or losing money) are not likely be funded using loan guarantees. While schools, roads and other public projects may be funded through loans, a private money-losing venture is not likely to be viewed in same way. Private ventures most likely will be expected to pay back their borrowings out of project income. This argues that subsidies will be required to increase the FIRR to levels sufficiently high to attract outside investors. Attracting IFI funding may require the smallest subsidies since IFIs generally can accept projects with a low FIRR.

A second "frontier" line (combined dots and dashes) marks the lower limit of project EIRRs below which it is very unlikely that public benefits from a project would be attractive to government. The area between the "frontiers" represents the zone in which most projects that can attract IFI financial support will fall. IFI lending is likely to be concentrated on projects (or packages of projects) that meet a threshold in size sufficient to overcome possibly large transaction costs of negotiating the loan, have medium to high EIRR but relatively modest FIRR, that need funding for relatively long periods of time, and that can be guaranteed by local or national governments (often a prerequisite for a loan).

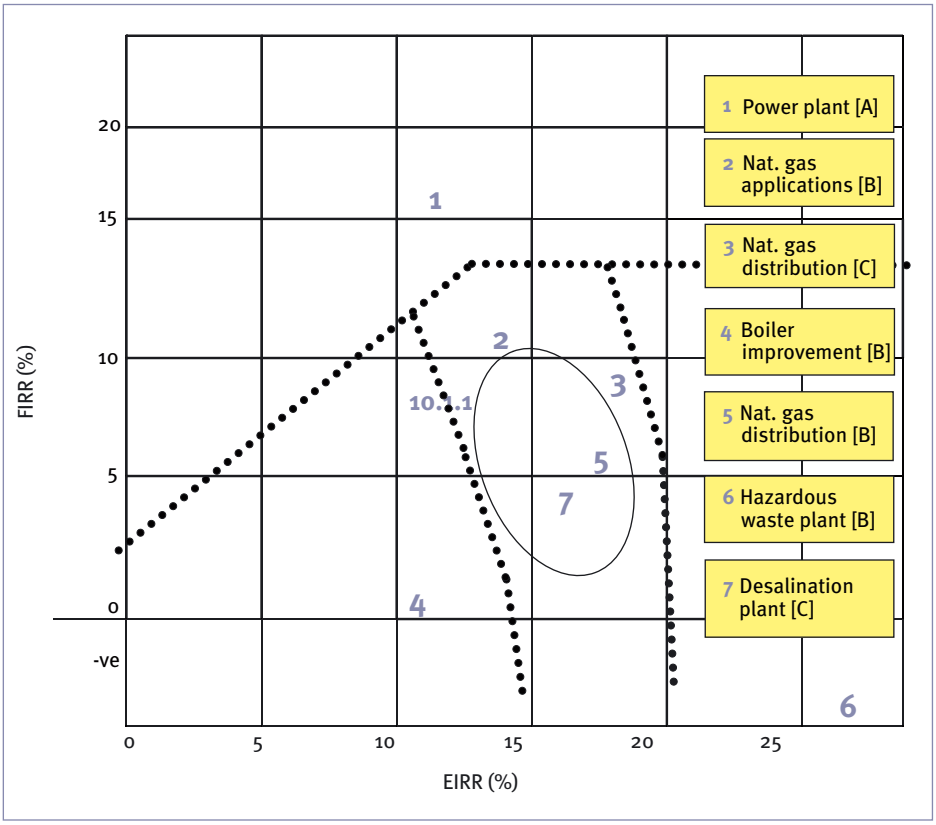
Examples of projects

To illustrate a range of energy and environmental projects, none of which, other than number 1, has a sufficiently high FIRR to lead to investments by the enterprises

themselves. Figure II below shows several typical projects (actually identified in China, ADB project, 2002). These are:

No.	Project	City	Remarks
1	Power plant expansion	A	Large, privately funded joint venture
2	Natural gas applications for industrial plants (miscellaneous equipment)	B	Very small investments
3	Natural gas distribution extension	C	Large investment but no loan guarantee (municipality not interested in IFI loan)
4	Environmental improvement by upgrading boilers	B	Very small investment
5	Gas distribution system extension	B	Small county-level investment.
6	Hazardous waste treatment facility	B	Modest investment; needs subsidies
7	Desalination plant	C	Modest investment

Figure II. Examples of typical projects



SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Financing

Module 20:
FINANCING OPTIONS FOR RENEWABLE ENERGY AND ENERGY EFFICIENCY

Module 20

SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Module overview

- Point of view of banking and financing institutions and risks associated with renewable energy (RE) and energy efficiency (EE) projects
- What are different financing models for RE and EE projects
- Possible policies and incentives to increase involvement of banking institutions
- Examples in different developing countries

Module 20

SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Module aims

- Present different financing models that have been developed and tested for RE and EE projects
- Explain point of view of banking and financing institutions and risks associated with RE and EE projects
- Present possible approaches / policies / incentives to increase involvement of banking and financing institutions
- Show examples in different developing countries

Module 20

SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Module learning outcomes

- Be able to explain the existing financing models and the reasons for their success or failure
- Understand which risks and elements are key for financing institutions when evaluating RE and EE projects
- Understand different options for policies and regulatory/support mechanisms to provide incentives for financial institutions
- Be able to argue which policy or regulatory approach suits best, given the national or regional situation

Module 20

SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Introduction

- RE and EE projects have a rather poor reputation within the financing community because they are viewed as higher risk investments:
  - Political risk
  - Technology risk
  - Market risk

Module 20

SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

The Financier's Perspective

- Risks:
  - Risk assessment and risk control
  - Each of the key risks involved allocated and priced
- Returns:
  - Calculate return on investment

=>Risk / Return profile

Module 20

SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Types of Financing

- Debt
  - Bond or loan + interest to be paid back
  - Commercial and development banks and funds
- Equity
  - Capital in return of share/ownership
  - Higher risk investment
  - Venture capital, institutional investors

Module 20

SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Types of Financing (2)

- Grants
  - "Gift", no repayment, specific goals and conditions
  - Development organisations
- Guarantees
  - Covers remaining risk to attract private sector
  - Development banks, MIGA

Module 20

SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Financing Models

- Government-led:
  - Government manages and coordinates funding
    - Ex. Rural electrification (solar) in Mexico, Chile and (hydro) in China
- Market-based
  - Consumer Finance
  - Leasing
  - Fee-for-Service (ESCO)
    - Ex. Sri Lanka, Honduras, South Africa (RE), China (EE)

Module 20

SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Existing Policies and Regulations

- Direct: Fiscal measures and Subsidies
- Market based: Feed-in/Quota systems/Clean Development Mechanism
- Audits and Feasibility studies
- Institutional Finance, ex. IREDA in India

Module 20

SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Existing Policies and Regulations (2)

- New funds and initiatives from development Banks:
  - Energy Efficiency Initiative / RE Investment Fund – Asian Development Bank
  - Sustainable Energy Initiative – EBRD
  - African Development Bank
  - IFC

Module 20

SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Design Aspects to Attract Investments

- Institutionalise clean energy policy:
  - Adopt laws, decrees and regulations
  - Appoint dedicated agency to implement policy initiatives
- Decrease investment costs:
  - Cf. subsidies/tax breaks/Feed-in and Quota systems/Clean Development Mechanism
- Decrease investor's risk:
  - Provide guarantees
  - Investors to develop risk assessing tools tailored to specific nature of RE and EE projects

Module 20

SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Design Aspects to Attract Investments (2)

- Increase investor's confidence:
  - Include long term targets and incentives in legal framework
- Increase awareness among key stakeholders:
  - Bankers / TSOs / local agencies
- Decrease transaction costs:
  - Tools to be developed cf. EEI-ADB and Programmatic CDM

Module 20

SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

List of Funding Resources

- International multilateral funding
  - Ex. World Bank, GEF, IFC
- Regional Development Banks
  - Ex. ADB, AfDB, EBRD
- Bilateral Agencies
  - Ex. DfID (UK), GTZ (Germany), US AID

Module 20

SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

List of Funding Resources (2)

- Government Finance
- Private Funds
  - Ex. Commercial banks / Ethical banks / Micro Finance Banks
- Private Foundations and Charities
  - Ex. Shell Foundation – BreathEasy Kenya

Module 20

SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Examples

- Rural Electrification SHS:
  - Kenya
  - Morocco
  - Sri Lanka
- Bagasse Cogeneration in Asia
- EE Investments in China's state owned energy-intensive industries

Module 20

SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

CONCLUSIONS

- Financiers` perception in RE/EE investment based on risks and returns
- Range of funding options and models available
- Clean Energy Policies should focus on:
  - Decrease investment costs for investors/project developers – several instruments available
  - Decrease risks – by governments (guarantees) and investors (risk assessing tools – familiarise with RE and EE technologies)
  - Increase investor's confidence by adopting long-term legal framework
  - Decrease transaction costs

Module 20

SUSTAINABLE ENERGY REGULATION AND POLICY-MAKING FOR AFRICA

Questions/Activities

"***Private financiers will never be interested in RE and EE projects because they are too risky and small scale.***"

True or False?

Discuss

Module 20

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