

**Asia-Pacific Economic Cooperation
Guidebook for Financing New and Renewable Energy Projects**

**ASIA-PACIFIC ECONOMIC COOPERATION
EXPERT GROUP ON NEW AND RENEWABLE ENERGY TECHNOLOGIES**



Prepared by

Sustainable Energy Solutions

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Prepared for the Asia-Pacific Economic Cooperation (APEC)
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TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	1
THE CHALLENGE.....	1
RENEWABLE ENERGY AS A SOLUTION	1
INVESTMENTS IN RENEWABLE ENERGY	1
PURPOSE OF THE GUIDEBOOK	2
MAJOR FINDINGS	2
Chapter 2.....	2
Chapter 3.....	2
Chapter 4.....	3
Chapter 5.....	3
Chapter 6.....	4
PROSPECTS FOR THE FUTURE OF FINANCING RENEWABLE ENERGY PROJECTS.....	4
CHAPTER 1: INTRODUCTION	2-1
<i>For Project Developers:</i>	
CHAPTER 2: MAKING THE MATCH BETWEEN GOOD IDEAS AND FINANCING	2-1
GENERAL CONCERNS WITH RURAL RENEWABLE ENERGY VENTURES	2-2
<i>What is the track record for rural renewable energy projects investments?</i>	2-2
<i>What are the business barriers to attracting investment?</i>	2-2
<i>How big is the rural market for renewable energy options?</i>	2-5
INVESTOR QUESTIONS ABOUT A SPECIFIC PROJECT	2-5
<i>Is the project well conceived?</i>	2-5
<i>Is the business and political environment supportive of the project?</i>	2-6
<i>Can customers afford the technology?</i>	2-6
<i>Who provides end-user financing?</i>	2-8
<i>Who provides marketing and after sales service?</i>	2-8
BUSINESS PLAN CHECKLIST.....	2-8
<i>Initial assessment</i>	2-8
<i>Business plan framework</i>	2-9
CHAPTER 3: FINANCING MECHANISMS	3-1
DEBT FINANCE.....	3-3
<i>Non-recourse financing</i>	3-3
<i>Development banks and multilateral institutions</i>	3-4
<i>Micro-credit</i>	3-4
<i>Leasing</i>	3-5
<i>Revolving funds</i>	3-5
<i>Rural credit cooperatives</i>	3-6
RISK MITIGATION MEASURES	3-7
<i>Loan guarantees</i>	3-7
<i>Partial loan guarantees</i>	3-8
<i>Political risk insurance</i>	3-8
EQUITY FINANCING	3-9
<i>Joint ventures</i>	3-10
<i>Equity investment funds and individual investors</i>	3-11
<i>Venture capital</i>	3-12
COMBINING FINANCIAL INSTRUMENTS.....	3-12
CASE STUDIES.....	3-13
<i>Bringing affordable energy services to rural areas</i>	3-13

<i>Solar energy businesses in rural areas</i>	3-15
<i>Turning crop residue into electricity</i>	3-16
<i>Using solar energy to create jobs</i>	3-17
CHAPTER 4: SOURCES OF CAPITAL	4-1
MULTILATERAL INSTITUTIONS	4-1
WORLD BANK	4-1
<i>Energy Sector Management Assistance</i>	4-4
<i>Global Environment Facility</i>	4-6
<i>Asia Alternative Energy Program</i>	4-12
INTERNATIONAL FINANCE CORPORATION	4-15
<i>Small and Medium Scale Enterprises Program</i>	4-16
<i>Renewable Energy and Energy Efficiency Fund</i>	4-19
<i>Solar Development Corporation</i>	4-22
REGIONAL AND NATIONAL DEVELOPMENT BANKS.....	4-25
<i>Asian Development Bank-Private Sector Group</i>	4-25
<i>Development Bank of the Philippines</i>	4-28
PRIVATE SECTOR: DEBT OR EQUITY	4-29
<i>E&Co</i>	4-29
<i>Environmental Enterprises Assistance Fund</i>	4-32
<i>Triodos Bank</i>	4-34
<i>Solar Bank Project</i>	4-40
<i>Solar Century Initiative</i>	4-42
<i>SunLight Power International Holdings, Inc.</i>	4-44
GOVERNMENT BILATERAL SUPPORT	4-47
<i>For Policymakers:</i>	
CHAPTER 5: CREATING A BUSINESS ENABLING ENVIRONMENT	5-1
REFORMING ENERGY SUBSIDIES	5-1
<i>Extent of subsidies in Asia</i>	5-1
<i>Direct Subsidies</i>	5-2
<i>Indirect subsidies</i>	5-2
<i>How subsidies can work</i>	5-3
REDUCTION OF IMPORT DUTIES.....	5-4
WHERE IS THE GRID GOING AND WHEN?.....	5-6
KEEPING AN EYE ON TIED AID PROGRAMS.....	5-7
CHAPTER 6: INNOVATIVE WAYS TO PROMOTE RENEWABLE ENERGY	6-1
IMPACT OF KYOTO PROTOCOL ON RENEWABLE ENERGY MARKETS	6-1
<i>Joint projects involving developing countries</i>	6-1
<i>Emissions trading</i>	6-3
RESOURCE CONCESSIONS	6-4
JOINT VENTURES	6-5
EDUCATION AND OUTREACH	6-7
TRAINING	6-9
PRODUCT AND SERVICE RATINGS	6-10
RENEWABLE ENERGY WEBSITE.....	6-11
CHAPTER 7: CONCLUSIONS	7-1
ABBREVIATIONS AND ACRONYMS	8-1
BIBLIOGRAPHY	9-1
APPENDIX A: CHARACTERIZATION OF THE APEC REGION	A-1

BUSINESS ENVIRONMENT	A-1
APEC'S ENERGY PROFILE	A-2
ENERGY SUPPLY <u>VS</u> ENERGY SERVICES	A-4
THE APEC RURAL ENERGY SITUATION TODAY	A-5
ENGAGING THE PRIVATE SECTOR.....	A-8
ROLE OF GOVERNMENTS IN THE APEC REGION	A-9
APPENDIX B: RURAL ELECTRIFICATION CHOICES	B-1
RURAL ELECTRICITY	B-1
DIESEL GENERATORS.....	B-2
RENEWABLE ENERGY TECHNOLOGIES	B-2
<i>Photovoltaics</i>	<i>B-3</i>
<i>Wind</i>	<i>B-4</i>
<i>Biomass</i>	<i>B-5</i>
<i>Fuel cells</i>	<i>B-5</i>
COSTS OF RENEWABLE ENERGY POWER	B-6
FURTHER INFORMATION ON RENEWABLE ENERGY AND RURAL ENERGY DEVELOPMENT	B-7
<i>Renewable energy</i>	<i>B-7</i>
<i>Rural energy development</i>	<i>B-8</i>
APPENDIX C: INDIVIDUALS AND ORGANIZATIONS CONSULTED IN THE PREPARATION OF THE APEC GUIDEBOOK FOR FINANCING NEW AND RENEWABLE ENERGY PROJECTS.....	C-1

EXECUTIVE SUMMARY

The challenge

Although great strides have been made in bringing the benefits of electrification to the rural areas of the APEC developing member economies, the job is not nearly complete. This is demonstrated by the fact that an estimated two billion people still have limited access to electricity and over two-thirds of these people live in rural areas. Out of a desire to privatize state-run industries while continuing to promote economic and social development has emerged an interest in encouraging the private sector to take on the challenge of funding the electrification of underserved rural areas. While large, capital intensive grid connected energy projects have continued to attract commercial financing, smaller energy projects have so far failed to bring in private investment dollars to the extent project developers would like to see. This is particularly true with renewable energy projects.

Renewable energy as a solution

Renewable energy technologies appear poised to play a much larger role in meeting the energy needs of the APEC developing member economies. Falling costs, growing environmental awareness and focusing political attention bring promise that renewable energy technologies may at last live up to their potential, especially in rural areas. Since renewable technologies are ready to help meet rural power needs, the question has become how to pay for their deployment. The answer lies in the liberalization of energy markets and the mobilization of private capital. To believe in this solution, one must assume that the rural population represents a strong market. Deliver on the promise of affordable, reliable power, and over 50% of the rural population is a potential renewable energy customer. The challenge remains how to finance projects, how to access the necessary capital, and how to spur investment in renewable energy markets.

Investments in renewable energy

Long-term growth in the market for renewable energy technologies is going to be determined by social and economic development that is occurring in both the rural and urban areas of developing member economies as well as by the ability of these technologies to compete with other energy options on a level playing field. From community-based energy service companies to international manufacturers of renewable technologies, and from the local entrepreneur selling appliances to the global investment banker, the private sector is looking at the need for energy in the rural areas and seeing opportunities. Each is at work creating tactics and techniques to access the capital required. And they are making progress. At the local level, entrepreneurs are figuring out ways in which creative financing can put energy within the reach of great numbers of people. At the international level, investors are beginning to see that it may be possible to get acceptable returns from risking money in rural energy ventures.

Purpose of the guidebook

Recognizing that a large gap exists between the investment community and project developer, a practical guide to financing of renewable energy projects in rural areas was developed. The purpose of this document is to be a guidebook for project developers, manufacturers, entrepreneurs, non-governmental organizations, community-based organizations, local utilities, and others on the various financing mechanisms that are appropriate for renewable energy projects in rural areas, the potential sources of capital for these projects, and how to access these organizations. In addition, policy and regulatory measures to promote the use of renewable energy and innovative measures that will help foster renewable energy development in the APEC region are presented in this guidebook. The hope is that this resource will help in furthering understanding of the financing issues that must be faced in designing or expanding renewable energy businesses in rural areas.

Major findings

Chapter 2

Chapter 2 addresses common concerns that investors may have with regard to financing a renewable energy business venture. The ability to attract sufficient capital to develop energy opportunities in rural areas is primarily dependent on the ability to offer investors competitive financial returns on their renewable energy investment. Until renewable energy projects have more of a track record with the investment community, current returns and risks will serve as a barrier.

Beyond traditional financing challenges, renewable energy faces other specific barriers that affect investment decisions. These hurdles include uncertain rates of return, high transaction costs, undeveloped and poorly understood markets and unfamiliarity with renewable energy technologies.

Prospective investors also need to be convinced that the projected sales and number of projects will justify their consideration. With ongoing technological developments, increased modularity and improving economies of scale of renewable energy technologies, markets are expected to expand. Another aspect of rural markets that is very important to an investor is the customers' ability to pay for the renewable energy system, and proper financing mechanisms are paramount to reaching out to the end-user. Sales in rural areas range from cash to financed sales to fee for service, depending on the income of the end-user.

Chapter 3

Chapter 3 discusses a variety of ways in which financing can be structured for renewable energy projects. To better understand the relationship between the host of potential investors, the various financial institutions that may be involved, and their relationship to the end-user in financing a renewable energy project, a value chain analysis is useful.

Historically, traditional types of financing have been difficult to secure for renewable

energy projects because of their small size, long payback period, and lack of identity in the financial markets. However, as renewable energy projects increase in visibility in capital markets and their risks are better understood, there will be a growing number of financing mechanisms tailored to smaller rural projects. This chapter describes a range of possible financing mechanisms, including debt, equity, risk mitigation, and hybrid structures. They are all near to mid-term possibilities for financing renewable energy projects.

Debt structures that may be appropriate include more traditional techniques such as non-recourse financing and loans from development banks or multilateral institutions, as well as smaller-scale lending through micro-credit, fee for service, revolving funds, and rural cooperatives. Under equity financing, possibilities include joint ventures, specialized investment funds, and venture capital. Loan guarantees and political risk insurance can also be important mechanisms to mitigate investment risk. Four case studies are also included to illustrate a range of financial structures that are being used in rural energy development.

Chapter 4

Chapter 4 identifies a range of financial institutions from the public and private sectors that are interested in capitalizing renewable energy businesses and projects. The financing organizations and groups noted in this chapter have made commitments to the increased use of renewable energy systems, and they are making capital available. Generally speaking, their common goal is to infuse capital and assistance into commercial businesses that are attempting to develop the rural market for renewable technologies and energy services. They accomplish this goal not by dispensing aid but rather by allying themselves with local businesses or entrepreneurs in order to leverage the capital and services they can provide.

Twenty different financial institutions and programs are discussed in detail, including their scope, funding allocations, project cycles, and eligibility requirements. Following the detailed descriptions of each program, there are summary tables with current contact information.

Chapter 5

Presented in Chapter 5 are important policy measures that will affect rural electrification and by extension adoption of renewable energy technologies. If public policies support an environment conducive to the spread of renewable technologies then entrepreneurs and investors should be attracted to the opportunity offered in rural areas. Fundamentally these policies need to promote the smooth functioning of the general economy. Policies that foster a healthy investment and business environment can lead to the creation of wealth, which is important in building sustainable businesses.

Proactive policies can help to open up and accelerate renewable energy markets and create a level playing field for competition. Subsidies, import duties, and tied-aid can have adverse impacts on markets by creating price distortions and undermining the efforts of the private sector. Through their elimination or reduction, market demand for

renewable energy will be enhanced. In addition, clearly defining the grid expansion plans in a member economy can support the introduction and adoption of renewable energy technologies. Often, such a statement is deemed to expend political capital but is a key to unlocking the entrepreneurial activity needed to expand rural energy production.

Chapter 6

A variety of measures to promote the use and adoption of renewable energy are discussed in Chapter 6. If the use of renewable energy technologies in rural areas is a priority, then efforts need to be made to create a market-pull for the products.

The Kyoto international climate change treaty may potentially be a driving force in building new markets for renewable energy technologies through joint projects between industrialized and developing countries and emissions trading. Resource concessions and joint ventures are other ways to engage the private sector in renewable energy development at a minimal cost to a host country.

Other means of spurring investments in renewable energy and creating customer satisfaction that are mentioned in Chapter 6 include setting performance and efficiency standards, education, training, and information exchange. Educating prospective buyers in rural areas on the value of the energy service is essential to creating market demand and consequently attracting investors. Equally important is building in-country capacity through training in the policy, technical, and financial sectors. An additional way to broaden the reach of renewable energy in the APEC region is to create an information clearinghouse on rural power, financing, and access to capital, perhaps through an Internet website.

Prospects for the future of financing renewable energy projects

In preparing this guidebook, a number of general conclusions can be drawn about investment in the renewable energy sector and how that will most likely be done. The general themes that emerge are:

- ❖ **There is a large market potential for renewable energy**
- ❖ **The challenge is to link the investment community with renewable energy projects**
- ❖ **There is a need for stable economic conditions, sound business practices, and risk mitigation measures to spur private sector investment**
- ❖ **It is important to increase the demand for renewable energy services and improve their affordability**
- ❖ **The profit margins from rural energy projects are improving in the long-term**
- ❖ **There is a need for improved education and outreach for project developers and investors, specifically including global access to information, training, and capacity-building**

CHAPTER 1 INTRODUCTION

The aggressive energy usage of the APEC member economies reflects compelling productivity. In 1996, the APEC member economies consumed over 50% of the world's generated energy supply. This energy appetite fuels 18 economies that have collectively experienced a sustained GDP growth of close to 6% for the last 10 years. The fastest growth is found in the developing member economies whose expanding presence in the global market economy has produced a wide array of opportunities for investment and profit. To maintain the rapid growth of these developing economies, a tremendous investment in the energy sector will be made. Over the next 15 years, roughly half of the world's expansion in energy capacity is projected to be in Asia, with a large part of that slated for the developing economies of the APEC region.

Not all areas of the developing APEC member economies are sharing equally in this impressive growth. Particularly in rural areas, the increase in both economic development and access to energy services has, in many cases, been minimal. Often, modern energy services are simply not available or are unaffordable. Meanwhile, lower load demands and geographic isolation have made it uneconomical to extend conventional grid service. Without a convenient, affordable energy supply, these areas will be unable to match the growth in productivity that other parts of the region enjoy. Over time, they will fall even further behind in their economic development, which could lead to both social and environmental problems.

Practical alternatives to grid extension exist. Among the most important of these are renewable energy technologies. Falling costs, growing environmental concerns and increasing political attention bring promise that renewable technologies can put modern energy services within the reach of underserved people. With this promise comes the hope that rural populations will at last have the access to the power they will need if they are to enjoy the rewards of economic expansion along with the rest of their countrymen.

One critical piece of the puzzle is lacking: capital to grow the rural renewable energy sector. A second key factor is the lack of economic returns typically seen for renewable energy projects, dictating where capital is used. With local and national governments practicing greater austerity, renewable energy projects can no longer rely either on subsidies or grants for funding. Instead, these projects must compete for investment dollars based on their financial performance and future prospects in the marketplace. The challenge for the renewable energy industry is to win this competition.

The gap in understanding between an investor and a rural consumer is vast and the technologies are in general not well understood. The problem is clear: neither party is convinced that buying or selling renewable technology in rural areas makes sound economic sense. Large numbers of the end-users of the energy, whether they are households, villages or businesses, have not yet been able to or chosen to invest their limited resources on the technology. At the same time, the international investment

community has not been convinced that the returns associated with rural renewable energy projects justify risking of capital.

This situation is unlikely to change until the developers of renewable energy projects listen more attentively to their customers, both consumers and investors. Evidence shows that the rural consumer will choose renewable energy if the product is reliable, effective and competitively priced. At the same time, certain investors will invest in a thoughtful business plan with a competitive rate of return. Too often, neither party is offered these basic requirements. Ultimately, it is the rural energy project developer who will be responsible for addressing these issues either by changing the product, the service or the price. They are the ones who must convince the consumer to buy and the investor to risk.

The good news is that throughout the APEC region and the world, progress is being made in addressing these issues. Creative policy initiatives and industrious entrepreneurs are working to turn on the capital spigot and generate economic returns. Significant innovations in micro-financing techniques and a better understanding of the needs of the rural population are unlocking demand for renewable technologies. Meanwhile, increasingly sophisticated business plans and a focus on execution are tempting certain types of investors. The challenge now is to develop bankable projects that are self-sustaining and will result in an increased rural energy supply.

Project developers do not work in a vacuum. APEC governments play a crucial role in promoting the adoption of renewable technologies. Project developers thrive only if they operate in a business environment that supports their efforts. Public policies and public investments foster this environment. By supporting private sector efforts to offer energy services to rural areas, governments can tap private capital to improve rural living conditions. As governments embrace policies that lead to the creation of wealth they will be indirectly supporting the spread of rural electrification by increasing the discretionary income of rural areas. In addition healthier capital markets will make it easier for developers to fund projects.

The target end-users for renewable energy systems in rural areas are defined by their ability to pay, and can range from individuals to the communities to business enterprises. The mixed economic profiles of the rural energy consumers determine the market for renewable energy systems. For the purposes of this study, it is assumed that up to 10% of the rural market is willing and able to pay cash for energy services; an additional 20-30% are potential consumers if access to affordable credit is offered; and up to 55% will use renewable energy systems if there are no upfront costs and they can purchase the energy services at a guaranteed rate (e.g., “fee-for-service”). The remaining portion, the so called “bottom poor,” are probably not buyers of energy services regardless of the financing model used and will require public assistance to meet their needs. In a world where an estimated two billion people still have limited access to electricity and have little hope that the grid will reach them any time soon, renewable energy offers too much promise to not be fully supported by governments and too much potential profit not to be tempting to the private sector.

The purpose of this guidebook is to describe financing mechanisms that are appropriate for renewable energy projects in rural areas and to identify potential sources of capital for these projects and how to access them. In addition, policy and regulatory measures that will promote the use of renewable energy and innovative measures that will help foster renewable energy development in the APEC region are discussed. This guidebook is designed to be a practical tool for project developers, manufacturers, entrepreneurs, non-governmental organizations, community-based organizations, local utilities, and others that are seeking financing for renewable energy projects in rural areas.

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Chapter 2 MAKING THE MATCH BETWEEN GOOD IDEAS AND FINANCING

Private sector financing of rural renewable energy projects, such as those utilizing photovoltaics, wind, and biomass technologies, is fairly new since typically these projects have been funded as stand-alone demonstration projects implemented by international development and bilateral aid programs in coordination with local governments. The exceptions to this are large-scale hydropower and geothermal projects for utility-scale applications which have been financed as typical bulk power projects. Now that many renewable energy technologies have matured and costs have been reduced enough to make them cost-competitive, there are new business opportunities with a unique set of challenges for the investment community.

Attracting sufficient private capital to fully develop energy opportunities in rural areas will require offering investors competitive financial returns. For this to happen, developers must design projects that can withstand the due diligence criteria to which prudent investors will subject them to. Prospective investors need to be convinced that risks have been anticipated, realistic business and marketing strategies have been devised and management possesses the experience to execute its business plan. Providing a high level of comfort is critical with rural renewable energy projects because the perceived risks have historically discouraged investors.

As they design projects, developers need to keep in mind where they will be raising the necessary capital. Until the renewable energy industry has more of a track record, targeting investors having an interest in “green” or “social” investment is going to be the key to obtaining funding since attracting investors who are interested only in commercial financial returns is going to be a challenge. Fortunately, many investors are comfortable with the terms and risks associated with financing renewable energy projects provided their other agendas (e.g. environment, climate change, etc.) are advanced. In some cases they are private investors and in others they are institutional investors. In Chapter 6, there are descriptions of many of the types of investors and sources of capital for renewable energy enterprises. However, before beginning the search for financing, a project developer must produce a well-thought out business strategy that can answer fundamental questions about the proposed project, the market, and profitability.

Numerous discussions with the public and private sector investment communities has yielded a number of common concerns with respect to investments in the renewable energy sector. The following are examples of questions that a renewable energy project developer should be prepared to answer in seeking capital for a business venture.

General concerns with rural renewable energy ventures

What is the track record for rural renewable energy project investments?

This is a vexing question for both project developers and investors. Investors generally want to see a history of profitable performance in an industry. Because renewable energy is new to the investment community, a track record for this type of investment is just beginning to be built up. The fact is, that even after all the effort that has been focused on bringing renewable energy solutions to rural areas, very few, if any, projects have yielded commercial returns that would justify placing anything other than venture capital at risk. Historically, problems that have inhibited this industry range from ill-conceived projects and bad management to a lack of supporting macro-economic conditions and very limited demand. As these problems have been recognized and addressed, project developers and manufacturers believe that the time is right for rural renewable energy projects to thrive if only the flow of capital can be turned on and there is an economic return on investment. Most of the companies active in the renewable energy sector are ready to seize the expanding markets. However, they suffer capital constraints and difficulties achieving sufficient profit margins.

What are the business barriers to attracting investment?

In the past, investors have been reluctant to participate in projects because of concerns with the business fundamentals of rural renewable energy. Some of these concerns are common to any new industry and others arise from the nature of the renewable energy business.

- **Uncertain (and typically low) rates of return:** Renewable energy projects are often associated with uncertain or low returns on investment when compared with the usual return on investments in conventional energy projects that they are usually in competition with. Because of the limited track record of the renewable energy industry, developers struggle to accurately forecast sales or expenses, and therefore predicting the rate of return for a renewable energy project can be difficult. The variables over which the project developer has limited control but which can have an impact on a project's bottom line include political instability, changing and/or uncertain government policies and regulations, currency risk, and changing markets. There are a number of other issues that also affect the rate of return, including technology obsolescence, shorter project time frames for financing, and a lack of technical and market information.

In order to satisfy investor criteria for risking capital, the rates of return need to be improved for renewable energy projects. A demonstrated record of performance and cost recovery as well as a risk profile provides the best means of evaluating future returns and helps attract potential investors. Also, if there were incentives for investors to provide long-term financing to renewable energy projects, then returns on renewable energy investments could be improved. It is also important that the investor be aware of technology developments that are underway so that

they are able to capitalize on the current emerging technologies. Finally, accurate technology and market profiles as well as information that shows how well investments have performed should be made available to financial institutions.

- **Foreign exchange risk:** Developers can face exchange rate risk if their revenue streams are in a currency different from the currency of financing. For example, a developer in the Philippines may have the opportunity to borrow Japanese Yen for five years at low rates from a renewable energy manufacturer in Japan. During those five years the project developer will be paying off the debt in Yen while receiving revenues in Philippine Pesos. If during that period the Peso weakens against the Yen, the project developer will be faced with higher payments in Peso terms while having the same Peso revenues. If the weakening is significant enough it could bankrupt the project. This has been the case in several rural energy projects which have been brought to a standstill by the recent upheaval in Asian financial markets and the currency devaluations that followed.

Fortunately, there are risk management tools available to mitigate this problem, and these should be investigated before any debt is incurred. These tools include: foreign exchange forward contracts, foreign exchange options, and currency swaps. These transactions are over-the-counter or customized transactions that can be entered into with an international bank. A forward allows the customer of a bank to guarantee a specific exchange rate on a fixed date in the future on a fixed amount of money, while a currency swap allows the customer to guarantee a specific exchange rate on a series of dates in the future. The project developer may determine that it is necessary to hedge all of the risk if the margins on the revenue stream are small. With larger margins the developer would be less sensitive to currency fluctuations and could afford to absorb some losses. When structuring the financing of a project, these transaction costs should be considered in the overall costs.

- **High project transaction costs:** Projects considered for rural areas are usually very small in terms of capital requirements, making it difficult for large investors to justify the cost of the due diligence process that they normally undertake. The transaction costs incurred in preparing a financing package can easily become very high relative to the amount of financing being sought for a small renewable energy project. For this reason, investment bankers have traditionally sought larger projects and the bigger fees they generate.

To help mitigate transaction costs, it has been suggested that similar smaller projects that meet particular financial criteria could be bundled together and considered as a single larger project. One large package containing many smaller projects could be presented to investors who would then be able to justify the due diligence that such an investment would demand. Because financial institutions need to have experience and familiarity with the technology and the associated financial instrument in order to make ongoing investments, replicability of small projects will also help reduce transaction costs. As financial institutions learn

through experience with smaller, easily duplicated projects, they can potentially improve their returns while reducing their risks. Another way in which smaller projects could be financed includes mortgage type financing for individual systems or financing provided on the basis of the project developer's assets and collateral (Ecotec, 1996). Finally, the due diligence process could be modified for smaller projects so that there are less stringent requirements on smaller individual projects. This would require finding investors who are willing to invest in a number of smaller projects with some additional degree of risk taken on because of the less stringent financial review. No single project would require as much investigation by the investor since the risk would be spread out across the portfolio of projects with the hope that at least some of the investments would lead to profitable returns.

- **Unfamiliarity with rural markets:** Rural markets present a particular challenge to an investor because of their diversity and lack of identity in capital markets. The financial community views itself as responding to the demand for finance rather than creating it, and therefore markets need to be stimulated in order to create an investment framework for rural areas. In the current age of credit reports and standardized mortgage reports, investors often do not feel immediately comfortable with consumer debt that does not rely on conventional collateral or with customers whose cash flow is seasonal, as is common in agricultural areas. This uncertainty is translated into higher levels of risks factored into the investment decisions and correspondingly less favorable terms for financing.

Information that is targeted at the financial sector on the strengths and weaknesses of rural markets is needed. This could include market briefings, profiles of the rural renewable energy sector, and case studies of successful financing models. For example, companies like P.T. Sudimara of Indonesia and financial intermediaries like Grameen Shakti in Bangladesh are showing that with the right financing vehicles, rural customers can support a profitable business. These models should be conveyed to the investor to instill confidence in the financial condition of end-users and in the strength of the market for the product. In addition, project developers must have a strategy for ensuring investors that end-users either reliably make their payments or lose their system. For example, by requiring on-time and regular payments for their energy services, Soluz Dominicana, which is based in the Dominican Republic, has enjoyed almost 100% collection of fees.

- **Unfamiliarity with renewable energy technology:** Renewable energy technologies are often viewed by investors as unproven and therefore renewable energy investments are often considered a high risk. This unfamiliarity with the technologies can greatly deter lenders from making an investment. Therefore it is critical to ensure that renewable energy projects involve technologies that have a proven track record and that the terms and conditions of the contracts are well understood (e.g., product guarantees, warranties, and service). The perception that the technologies are unproven and unreliable is pervasive within the investment community.

Awareness by financiers of up-front capital costs, operating costs, technical performance, and equipment life expectancy are essential in accurately characterizing a project. In the case of biomass, wind and photovoltaic technologies, it is essential that they are field-tested and their performance is well understood. Unless investors are comfortable with the particular technology they are financing, they will be unlikely to risk their capital for renewable energy projects. Therefore, project developers and manufacturers need to demonstrate the reliability of renewable energy systems by further establishing a track record of performance, cost-effectiveness, and applicability to rural areas. These issues should be clearly explained in the project developer's business plan. As an aside, unfamiliarity with technology is of minor importance in comparison to the barriers mentioned previously.

How large is the rural market for renewable energy options?

This is a difficult question to answer since over two billion people are without access to modern energy services and yet the number of installed renewable energy systems is still very small. However, sales of renewable technologies are growing and the projections are promising. For example, the world market for small wind turbines was \$23 million in 1995 and growing at 30% a year (M. Bergey, Bergey Windpower, personal communication). For photovoltaics, the sales in 1997 were US\$600 million and sales are expected to grow at an impressive rate. By the year 2010 worldwide sales of photovoltaics are estimated to grow to US\$5 billion (M. Hammonds, BP Solar, personal communication). Despite these impressive growth projections, renewable energy will still make up a relatively small part of the energy supply portfolio, but with ongoing technological developments, increased modularity and improving economies of scale in the manufacturing process, sales are expected to increase. Confidence in the market is also indicated by the increased investment being made by large photovoltaic manufacturers (e.g, BP Solar and Siemens) in rural areas of the APEC region.

Investor Questions About A Specific Project

Is the project well conceived?

A decade ago, when energy projects were designed as demonstration or pilot projects, funding agencies were more concerned with technology deployment than with the management skills of the operator or the profitability of the project. This situation has changed. Investors now require projects to be well formulated, well managed, and have realistic goals. Too often, the renewable energy projects that investors are asked to finance do not offer some or any of these elements. In fact, privately, some members of the renewable energy community are saying that it is a lack of fundable projects that show an economic return rather than a lack of capital that is slowing the spread of the technology. Recognizing this, many business development organizations are attempting to anticipate investor concerns and helping project developers design projects

accordingly. These organizations work with project developers to shape their business plans so that due diligence requirements of investors are met. As an example, the World Bank, International Finance Corporation (IFC), and several U.S. charitable foundations are designing a new fund, the Solar Development Corporation, which has earmarked close to a third of its capital or nearly US\$15 million dollars to business development services. The intent is that these resources will be utilized to shape projects that then will be eligible for Solar Development Corporation funding.

Is the business and political environment supportive of the project?

As a World Bank (1997) study on rural finance shows, rural financial markets and rural energy markets require a supportive business environment if they are to thrive. This includes providing the right macroeconomic conditions, removing policy biases against the rural sector and establishing integrated and efficient financial markets that put credit within the reach of the rural population. Investors will be looking to see if these conditions are in place.

In terms of macroeconomic issues, the key is that policymakers pursue prudent fiscal and monetary policies to achieve price stability and to maintain a sound, well-aligned exchange rate policy. As noted earlier, and as the recent events in some Asian member economies have illustrated, the lack of such policies can have a negative impact on rural electrification efforts.

Governments can work to strengthen and regulate financial institutions that serve rural areas. Accomplishing this would increase the transparency, accountability, and risk bearing capacity of these institutions. By encouraging the growth of robust financial markets, the government can increase the rural population's access to capital, which will improve the prospects for economic activity generally, and energy projects specifically.

Can the customers afford the technology?

Increasingly the answer to this question has been yes. That is, the rural energy consumer is willing and able to pay for energy services that meet his or her needs. Entrepreneurs are realizing that the rural markets are strong if the proper financing mechanisms are in place. In recent years, three models for successfully selling rural renewable systems have emerged.

- **Cash Sales:** Ten percent of the rural population is thought to have the resources to pay in full for an energy system. This is the group that is often described as “the low hanging fruit,” or the customers who are most easily able to pay with cash. Most biomass systems and some of the solar home systems are purchased this way. Given the dispersed nature of the rural population, relying exclusively on cash sales can require targeting a broad market that can create problems in marketing, installation and service over a large geographic area.
- **Financed Sales:** An additional 20 to 30% of the population are potential

customers if access to credit is an option. In most cases, an initial cash payment of 20-35% is required and monthly payments are made on the balance. Occasionally a dealer will make loans directly, but this is usually done more effectively and economically by a local lending institution such as an agricultural cooperative or local bank. Until recently, few rural lenders have shown willingness to make loans for energy systems, particularly at the household level. Fortunately, this has begun to change as lenders have become more familiar with the technology and have designed repayment plans that are tailored to the consumer. The three main barriers to these types of loans are:

- (1) **High Initial Costs:** Saving enough money to make an initial cash payment of at least 20% can be extremely difficult for a customer given the high cost of the energy systems. The experience of Sudimara of Indonesia shows that lowering the amount of the down payment has much more of an impact on sales than lowering the monthly payment. Many potential customers just do not have the cash reserves to be able to afford a high down payment even though they have a monthly cash flow that permits them to service the debt.
 - (2) **Non-traditional loan collateral:** Frequently a customer does not have access to the types of assets that lenders typically consider when structuring a loan, such as a title to property. Increasingly, lenders are willing to view the system itself as collateral, since it is easily repossessed. However, in certain cultural-political environments it might prove difficult to remove a home system from a customer who cannot pay.
 - (3) **Transaction costs:** Relatively small loan amounts can be seen to generate a return that does not justify the cost of administering the transaction. Grameen Shakti of Bangladesh has, however, shown that it is possible to make a profit even with very small loans, on the order of \$300.
- **Fee for Service:** Over 50% of rural populations are thought to be potential users of renewable energy if there is no upfront cost and the only charge is a monthly fee for an energy service (e.g., electricity). Under this scenario, the system installer acts as an energy service company (see the case study on SOLUZ at the end of Chapter 3) for a detailed description of this model). The dealer is responsible for installation and maintenance. If the customer doesn't pay the monthly fee, then the system is removed. This monthly fee tends to equal the amount that the customer is currently paying for fuel (e.g. diesel), making it a relatively easy expenditure to justify for the consumer. By removing the down payment burden, the fee for service model appears to put renewable energy within reach of most people. This is the model for solar home systems that appears to be most attractive to outside investors, and it is being duplicated in several countries.

Who provides end-user financing?

Particularly in the case of solar home systems, financing for end-users can be provided by

a dealer. This poses a challenge for dealers in that it necessitates having large capital reserves and can be a concern for an investor. If a dealer is arranging financing and is also responsible for collecting payment, they may not be as focused on increasing sales. Currently, since local lending institutions often lack experience with making renewable energy system loans, sellers may have to be responsible for extending credit to customers. However, as rural lending institutions become comfortable with renewable technology loans, dealers can stop being lenders. This will lead to benefits both in terms of their focus and the balance sheet.

Who provides marketing and after sales service?

Given the embryonic state of renewable energy development in rural areas, entrepreneurs are usually required to do everything from educating the marketplace to handling after-sales service and bill collection. Such a broad range of responsibilities can cause a huge drain of both economic and personnel resources and yet they are essential to the success of a venture. A comprehensive business plan must explain how these services will be provided. Clearly supporting such a range of services is going to demand that a company grow to a rather substantial size before it becomes profitable. Therefore, having sufficient capital reserves to last during this period of growth is critical. Or, the company will have to fund expansion through cash flow, which may constrain growth.

Business Plan Checklist

A business plan is essentially the road map that tells prospective investors how a project developer intends to reach financial and programmatic goals. It is a statement of purpose that, if successful, convinces investors that they can have reasonable expectations of a return on the capital put to risk. More importantly, the business plan should show that the developer has anticipated risks, has devised strategies for overcoming them, and has the experience to execute the strategy. This is especially critical in renewable energy business plans because the risks associated with these projects have historically been perceived by the investment community as very high and difficult to characterize. Whether investors are concerned about the intended market, the rural population of developing countries or are concerned about renewable technologies, the developer has to provide answers within the business plan. A secondary purpose of the business plan is to outline a company's strategic plan and guide the operations of the company.

Initial assessment

Before preparing a business plan, there are a number of issues that the project developer must address in order to enter the renewable energy market. A thorough assessment of the fundamental aspects of the potential market, the end-user, and in-country resources are critical in preparing a well-thought out business plan. Issues to be considered include:

- ✓ Current energy services being provided and prices being paid by end-users
- ✓ Renewable energy resources

- ✓ Appropriate technology given the energy services required by end-users
- ✓ Economic profiles of end-users
- ✓ Previous experience and familiarity in the community with renewable energy
- ✓ Market demand for the product/service
- ✓ Existing mechanisms available to build a maintenance and spare parts infrastructure
- ✓ Existing rural credit, savings, and banking institutions
- ✓ Presence of local organization or partner interested in renewable energy development
- ✓ Existing complementary infrastructure (e.g., transport and communication)

Business plan framework

After the initial assessment of the project, the pertinent financial, technical, and operational information about the proposed business venture must be determined to develop the business plan. A summary of the elements that could be contained in a business plan are presented to highlight the range of different issues that will need to be considered before approaching potential investors. These include:

PROJECT DEVELOPER IDENTIFICATION

- ✓ The company and its corporate objectives
- ✓ Management capacity
- ✓ Experience

PROJECT PLAN

- ✓ Description of the project and technology
- ✓ Schedule of project implementation
- ✓ Products/services being deployed in the market
- ✓ Proposed location
- ✓ Capital equipment and infrastructure requirements
- ✓ Human resources needed and in-country capacity

MARKETING

- ✓ Market overview
- ✓ Market segments for the product/service (e.g., household, small industrial, and/or public services)
- ✓ Marketing and promotion strategy
- ✓ Estimate of current and projected demand for the product/service
- ✓ Competition for the product/service in terms of quality and price
- ✓ Expected production capacity and market share

FINANCIAL

- ✓ Total project cost
- ✓ Fixed assets
- ✓ Working capital requirements
- ✓ Projected sales, prices, and revenue stream

- ✓ Costs to manufacture and sell the product/service
- ✓ Projected internal rate of return
- ✓ Assessment of risk exposure (e.g., exchange rate, interest rate, power purchase agreements, and government policies)
- ✓ Financing received from other sources (e.g., multilateral, concessional, and grants)
- ✓ Assessment of cash flow with respect to costs of maintenance, service, end-user payment default, future purchases, staff support, etc.)

TECHNICAL ISSUES

- ✓ Source of the product components (locally produced or imported)
- ✓ Possibility of doing local assembly
- ✓ Requirements for installation
- ✓ Operational history of the equipment
- ✓ Capability for project monitoring
- ✓ Equipment maintenance requirements

OPERATIONAL ISSUES

- ✓ End-user financing (e.g., fee for service, credit, or purchase)
- ✓ Transaction costs
- ✓ Method for collection of fees and payment levels
- ✓ Policy to handle defaults on loans and terms of repossession
- ✓ Local financial intermediaries that could be used to manage end-user financing
- ✓ Mechanism for sales, installation, and service
- ✓ Training and capacity-building of local community in operation of system
- ✓ Plan for procurement and assembly of main system components
- ✓ Details of consumer protection measures including warranties, service, and education

Chapter 3 FINANCING MECHANISMS

As APEC member economies have embraced policies that ultimately lead to a shrinking government presence, a stronger private sector, and liberalized capital markets, the method in which infrastructure projects are being financed has changed. The potential funding sources for new energy projects have multiplied. Whereas in the past the state wholly owned most energy developments, now joint ventures between public and private entities are much more common. This latter model provides a more flexible framework for sharing project risks and permits a wide variety of debt/equity structures (Razavi, 1996). Developers of all types of energy projects can begin to utilize these financing mechanisms to access capital that was previously unavailable.

Government need to take action if private investment, including debt and equity finance, is to become an important source of project funding. Critical to encouraging private investment in emerging markets are laws that support transparent legislation and regulations that help promote better macroeconomic fundamentals. In addition, the implementation of regulatory and legal measures that protect investors and developers are necessary. Stronger laws governing contracts, new bankruptcy codes to allow corporate failure and a more open environment for mergers and acquisitions will promote investment. Measures requiring full disclosure, particularly of liabilities, and supporting freer access to credit information will allow investors to more accurately assess risk. Employing standardized accounting and banking procedures will speed up the due diligence process.

To better understand the relationship between possible investors and the renewable energy product cycle, in light of investors role in project development and financing, a value chain analysis is useful (Environmental Advantage, 1995). A value chain analysis illustrates the steps that occur in the project development process, the range of players involved at each step, and the concerns that each of the players may have. This framework (Figure 3-1) illustrates the types of potential investors, the various financial institutions that may be involved, and their relationship to the end-user in developing a renewable energy project. There are several entry points along the chain for potential investors, depending on the scale and focus of their investment. The issues facing the institutional investor are obviously much different than the financial intermediary, and when structuring the financing package it is important to keep in mind who is being approached and how to address their particular concerns. For example, institutional investors are interested in investment-grade products with high rates of return whereas financial intermediaries (e.g., village credit facilities, local banks, and rural cooperatives) may be able to work with smaller margins or leverage their funds with other types of funding. The chain can also be entered by making investments in project developers or manufacturers. The primary linkage with end-users is through financial intermediaries and local retailers, who both require capital in order to provide credit to end-users. Since providing end-users with affordable and reliable energy services is the goal, this linkage is perhaps the most important.