Financing Issues and Options for Renewable Energy Projects in South East Asia

www.serd.ait.ac.th/reric

Romel M. Carlos [*], Alan Dale C. Gonzales [*] and Sundar Venkatesh [**]

[*] EC-ASEAN COGEN Programme, Asian Institute of Technology

[**] School of Management, Asian Institute of Technology

P.O. Box 4, Klong Luang, Pathumthani 12120

THAILAND

ABSTRACT

South East Asia is endowed with many indigenous and renewable fuel sources particularly agricultural residues, wind and solar. Utilizing these resources in lieu of the often-polluting and limited-resource fossil fuel is an avenue to mitigate greenhouse gasses which are harmful to the environment. Moreover, some of the technologies, equipment and processes currently being used in industries in the region are old and often inefficient. These present great potential for activities leading to higher energy efficiency.

Some countries in South East Asia have made considerable progress in their support for biomass energy. This support comes in different forms, including awareness-building through information dissemination and technology demonstrations, support for energy audits, and financial incentives, among others. Despite these, not many projects related to biomass power generation and cogeneration are being implemented in south East Asia, compared with what can be potentially achieved. For many of these projects, financing is becoming the single-most important factor for the success or failure of their implementation. The paper investigates the barriers, risks and success factors related to the financing of these types of projects. Measures and options to remove the barriers and mechanisms that are likely to facilitate financing of these projects are suggested.

The implementation of renewable energy projects can bring numerous benefits to the global environment, the national government and the owner of the project. Some of the benefits include:

- *more favourable environmental impact*
- *energy costs savings (reduced purchases of grid electricity, diesel and bunker oil)*
- *income from sales of excess electricity to the grid*
- *elimination of disposal costs associated with wastes and residues*
- *use of indigenous fuel resource*
- *reduction of financial burden for the public sector associated with investments in electricity generation and distribution*

These concepts and technologies, however, still face barriers against widespread diffusion and are yet to gain wide market acceptance. These barriers can be institutional, technical and financial. This paper looks more closely on the financing aspects and the participation of the private sector in the development and implementation of these types of projects.

1. FINANCING MECHANISMS USED IN RENEWABLE ENERGY PROJECTS

Renewable energy tends to have high initial costs and low operating costs compared to conventional technologies. The success of any financing approach for these options depends on the

degree to which it meets and completes several key tasks including finding sustainable financing mechanisms, making strategic alliances, and reducing transaction costs and minimizing risks. Moreover, broad institutional groundwork is needed including good pricing policies, efficient power sector management, viable lending institutions, credible regulatory policies and solid legal frameworks. Success will also depend on conducive frameworks for market and investment growth.

Presented in the following sections are the traditional financing routes and sources as well as the existing financing schemes being used by the financing institutions and projects developers particularly in funding the types of projects mentioned above.

1.1 Traditional Financing Routes and Sources

During their financial planning, developers of renewable energy projects face a decision of how financing should be done. Generally, any of the three traditional financing routes and associated sources is chosen.

1.1.1 On-balance Sheet (Corporate Finance)

On-balance sheet finance is generally the simplest means of raising finance. It is likely to be used only by strong corporate sponsors. Although corporate finance can be raised by the issuance of shares or bonds or internal reserves, in most cases it involves raising debt based on the full corporate strength of the borrower at a price that reflects the corporate creditworthiness.

Corporate loans are generally easy to arrange if the borrower is considered creditworthy, but repayment periods are normally less than ten years. As the lender does not scrutinize the project documents and contracts rigorously, the up-front expenses and time invested are far less than that for project finance. The structure of the project and the project risk profile would not influence the price of the loan as the corporate borrower accepts all the project risks. The arrangement fees and interest margins over base rate will vary considerably depending on the standing of the borrower.

1.1.2 Project finance

Project finance is a means of raising the funds required for a capital investment project where the providers of equity rely primarily on the cash flow of the project for the return on their investment, and the providers of debt for the payment of interest and repayment of the principal borrowed by the project.

Projects using the project finance route are developed by borrowing funds based on the creditworthiness of the project alone rather than of the sponsor. All project assets such as the plant hardware and the equity shareholdings would be pledged in support of the loan, as a security in the event of default. As the loan is not borrowed directly by the sponsor of the project, this transaction is not recorded on the balance sheet of the sponsor.

Sometimes, lenders may require some recourse to the sponsors, for example, in the form of guarantees. This type of limited recourse project finance has been used to finance projects involving energy generation, among others. Many renewable energy projects, however, are too small for traditional project finance. Some banks may lend to these types projects if there is a strong prospect that the sponsor will bring forward more similar projects.

The banks place more stringent criteria for lending on a project finance basis. This imposes heavy requirements and contractual implications upon the developers of the projects. Some of these implications are:

- Longer time required to arrange and are more expensive to establish than conventional corporate loans

- Strict requirements for due-diligence as well as for legal and technical assessments
- High compliance expected for administration and reporting requirements
- Involves complex legal documentation and contractual arrangements

Despite the above constraints, for many developers, the benefits of using project finance outweigh the disadvantages. The contractual arrangements implicit in project finance effectively transfer many of the risks away from the developer to those better able to manage and control them. Although the up-front expense is greater for the project finance, the overall cost of finance may be lower. Two things mainly contribute to this: the high gearing attained by a project, with some debt finance meeting up to 85% of the capital cost, and debt is cheaper to service than equity (as interest payments are tax deductible). The lower cost of capital, coupled with the fact that projects are often developed by joint venture companies which are anxious to avoid balance sheet treatment of a project loan for non-core business, means that limited recourse finance is often the preferred route.

Experience in the implementation of small-scale renewable energy projects in the region shows that using the project finance route for these types of projects is difficult, if not impossible, to arrange.[1] Lenders normally perceive renewable energy projects to have high risks and thus require very stringent security arrangements. This always ends up for the project sponsors to borrow on their balance sheet, or to provide corporate (sometimes personal) guarantees if loans are borrowed by a special purpose company created purposely for the project.

1.1.3 Self-financing

Self-financing means that the company uses its own internal funds to finance the investment. Usually, this will come from the retained earnings or from existing cash reserves. Where a project is being developed by individuals or a small or new company without reserves, it may be necessary to raise funds from private entities/individuals, either to provide equity or to fund the whole project. This may be in the form of 'cash', unsecured or secured loans (mortgage) from friends, associates and/or local banks/building societies.

Since the cost of equity is normally higher than the cost of debt, self-financing is not the most efficient route to finance a project, except for some circumstances where it is not attractive to leverage the project, or when the project is small enough for the company to pay for the whole project cost from its own funds.

1.2 Existing Financing Schemes

The table below summarizes the possible financing mechanisms relevant to renewable energy projects and their applicability to the different size ranges of the projects.

[1] The EC-ASEAN COGEN Programme supported 14 industrial-scale biomass energy projects in South East Asia between 1993-1999. All of the projects have been financed on the balance sheet of the companies.

Table 2 Ranges of projects and possible financing mechanisms

System	Scope	Financing mechanisms/schemes
Small-Scale/ Off-Grid	• Solar photovoltaic home systems • Small windpower systems and hybrid solar/wind/diesel systems that have no associated distribution network • Pico- and micro-hydropower • Size is < 1 MW	Should develop innovative financial mechanisms to cascade affordable financing to the end-users, and seek assistance for institutional, infrastructure and capacity building. Applicable schemes include: • Self-financing • On-balance sheet • Micro-credit • Grant/subsidy • RESCO/ESCO • Leasing • First-cost subsidies and lower import duties • Supplier's credit • Dealer's credit • Financial bundling
Medium-Scale/ Isolated-Grid/ Grid-Connected	• Mini- hydropower • Biomass gasifiers and cogeneration systems • Wind/diesel/solar hybrids and other medium-scale renewable energy systems in the range of 1-15 MW	Should use innovative mechanisms, while exploiting the benefits of financing schemes applied to conventional energy. Applicable schemes include: • On-balance sheet • Equity financing • Venture capital • Project finance (limited recourse) • Corporate guarantee • Grant/subsidy • RESCO/ESCO • Leasing • Supplier's credit • Financial bundling
Large-Scale/ Grid Connected	• all renewable energy systems with capacity greater than 15 MW	Should operate within the same financing rules applied to conventional energy projects. Applicable schemes include: • Project finance (limited/non-recourse) • Venture capital • Multilateral agency lending • Export Credit Agencies • Political risk guarantee • Bonds issuance • Supplier's credit

2. PERCEPTIONS, CONSTRAINTS AND VIEWS OF PROJECT STAKEHOLDERS

Despite the existence of the foregoing mechanisms currently being introduced in projects involving renewable energy, there is still a dearth of examples of projects that have been financed in a more sustainable way, i.e., on a purely commercial basis without full recourse to the sponsors.

Face-to-face interviews using structured questionnaires have been conducted with the top executives of selected financing institutions, project developers and sponsors in Malaysia and Thailand to shed light on the above observation. The aim is to gather primary information on the perceptions, constraints, views and experiences of these companies on their practical involvement in developing and financing renewable energy projects. In South East Asia, Malaysia and Thailand are in the forefront of promoting the use of renewable energy. The projects in these areas, however, are still experiencing difficulties in obtaining financing.

The two target groups of companies are the major stakeholders involved in the financing of projects. Most of them are private sector companies which participate in the projects for commercial purposes. The financing institutions considered in this study include the traditional sources of debt financing such as banks and other institutions that provide funds without participation in the actual management of the projects. The project developers/sponsors refer to companies involved in the development and implementation of projects, normally through the provision of equity and participation in the management of these projects.

The typical persons who were interviewed consist of:

- For Financing Institutions: Vice Presidents, Senior Vice Presidents and mid-level managers of Corporate/Project Finance Departments
- For Project Developers/Sponsors: CEO, Owner, Financial Officers, Managers/Vice Presidents of Project Development Departments

Two sets of questionnaires were designed catering to each target group. The questionnaires, as well as the conduct of interviews, where appropriate, were harmonized in order to capture and compare the views of the two groups on the same issue. The table below shows the number of samples interviewed in the two groups in the two countries chosen.

Table 3 Number of samples interviewed

	Malaysia	Thailand	*Total*
Financing Institutions	3	6	*9*
Project Developers/Sponsors	4	5	*9*
Total	*7*	*11*	*18*

2.1 Barriers

The Malaysian and Thai Governments are now very active in the promotion of projects that are shown to mitigate greenhouse gas emissions and at the same time conserve their resources by providing incentives for their development and implementation. The incentives given by the governments of these countries to these projects are significant since they recognise the importance of preserving the environment. This elevates the status of these projects in the national equation. This strategic move generated greater interest in using renewable energy as an alternative source of fuel to generate electricity. More importantly, there is a positive attitude towards renewable energy as evident in the answers of the financing institutions and project developers/sponsors.

From the point of view of technology, commercially proven and mature technologies are available in the market. References of these technologies currently being operated in the developed as well as in some developing countries are available.

In spite these, barriers still exist that hinder the financing of renewable energy projects. The significant barriers pointed out by the companies interviewed are presented in the table below and are discussed afterwards.

Table 4 Barriers in the development and financing of renewable energy projects

Barriers	FI[(a)]	PD/S[(b)]	*Total*
No/lack of expertise in financial packaging	5	8	*13*
Not familiar with the technology	6	1	*7*
Expensive	0	6	*6*
High risks	4	1	*5*
Too small	2	0	*2*
Lack of funding	0	2	*2*

Note: Total does not tally with the number of interviewees because of multiple answers
(a) financing institutions; (b) project developers/sponsors

2.1.1 Lack of skill in financial packaging

Small-scale project developers lack the in-house expertise to look for funds, prepare the financial plan of the project, and negotiate with lenders to obtain the most favourable financing terms. This is very evident in the fact that 8 out 9 project developers/sponsors surveyed indicated this as a barrier.

Although financial institutions are normally adept in this activity, they feel inadequate in finding the right scheme that would suit projects involving renewable energy, and at the same time reflect a credit structure that would be acceptable to both parties.

2.1.2 Financial institutions lack the expertise to evaluate these types of projects

Financial institutions do not normally maintain among its staff people who have enough background and expertise to evaluate renewable energy projects. The staff who evaluate projects requesting for financing are, in general, not familiar with these technologies. This leads to reluctance in even starting to consider doing a due diligence exercise on these types of projects.

2.1.3 Barrier related to affordability of renewable energy projects

Renewable energy projects are perceived to be expensive. The initial costs of renewable energy tend to be much higher than the conventional means even if the amortised costs over the lifetime of the technologies are lower compared to conventional sources. The impact that transaction costs have on energy system prices should also be considered. Transaction costs, which are the costs incurred when buying or selling assets, increase the price of renewable energy technologies at all stages of the delivery chain. These affect the viability of the project, a factor which is of prime importance for the participation of the private sector.

2.1.4 Renewable energy projects are considered risky by financing institutions

There is a general lack of confidence among financial institutions in technologies involving renewable energy. This is partly because they are unfamiliar with the technologies, and partly because of concerns related to the availability of feedstock supply/resources such as biomass, wind, sunlight and river water. This makes them too cautious in lending to these kinds of projects. Although references of projects successfully operating in similar environments are available, very few financiers have visited these projects and have seen them operating. In addition, the existing financing schemes usually require a long application and approval procedure and are not appropriate for small renewable energy projects.

2.1.5 Many renewable energy projects are considered too small

The classic complaint of lenders when dealing with these projects is that it takes about the same efforts to evaluate a small project as a big one. Thus, if a project does not reach a certain critical mass in terms of project cost, lenders are not willing to take the project into its portfolio of possible lending candidates.

2.2 Risks

One of the elements given careful consideration in financing an energy project is the understanding of the risks involved in the development, financing, construction and operation of the project. Proper appreciation of these risks is crucial in mitigating these risks and in allocating them to the parties most competent to manage them. The table below shows the level of importance the financing institutions and project developers/sponsors place in the different risks involved in developing renewable energy projects.

Table 5 Risks involved in developing renewable energy projects

Risks	Average weight (1 = insignificant; 10 = crucial)				
	Total Sample (N=18)	FI[a]		PD/S[b]	
		Mal (N=3)	Thai (N=6)	Mal (N=4)	Thai (N=5)
1) Fuel/feedstock risk	8.89	9.33	8.67	8.50	9.20
2) Sponsor risk	7.89	9.33	8.00	6.00	8.40
3) Market/revenue/off-take risk	7.50	9.33	9.33	6.50	5.00
4) Technical risk	7.44	8.67	9.17	7.00	5.00
5) Financial/legal risk	7.00	7.67	8.50	5.25	6.20
6) Construction risk	6.72	7.67	8.67	6.50	4.00
7) Environmental risk	6.67	6.67	8.17	6.50	5.00
8) Operation risk	6.39	7.00	8.00	5.25	5.00
9) Insurance risk	5.83	7.67	7.00	3.75	5.00
10) Political risk	5.72	4.00	7.17	5.00	5.60

(a) financing institutions; (b) project developers/sponsors

The ten risks identified and listed above are considered relevant and important by the two target groups in the development and implementation of renewable energy projects as evident from the average scores in the table above. It can also be seen from the scores that the financing institutions and project developers/sponsors are in one accord that the fuel/feedstock risk is the most important risk. This is understandable because security of fuel supply is a prime concern in such projects. Unlike conventional fuels such as coal and natural gas, it is quite rare for renewable energy projects to secure long-term fuel availability contracts.

The sponsor of the renewable energy project is also considered as a key element in the evaluation of the uncertainty of the project. It is crucial that sponsors be willing to do whatever is necessary to make the project successful. Another issue to be considered in the uncertainty equation will be the involvement of other shareholders and equity participants.

It is also evident that the market/revenue/off-take risk is crucial in the development and financing of renewable energy projects. For financing institutions, the off-taker should be reliable and

will not default. On the other hand, this is important for the project developers/sponsors because this eventually affects their bottom line – whether they will eventually receive their expected benefits or not.

2.3 Success Factors

The success of the financing of renewable energy projects depends on several parameters that, taken together, contribute to a strong fundamental that makes the projects bankable. The structure of a project company may be a simple one or might involve a complex network of stakeholders, each with different roles and interests in the project. Understanding these roles and their underlying interests is crucial in achieving the goal of successfully financing a project while meeting the individual requirements of the different stakeholders.

The prime movers in financing energy projects are the project developers/sponsors, which implement the project and provide equity and the financing institutions, which provide the debt portion of the funds. The table below shows the views of these stakeholders concerning the factors that contribute to the overall success in financing renewable energy projects. Based on their experiences and perceptions, the interviewees scored these success factors using a rating of 1 to 10, with 1 as "insignificant" and 10 as "crucial".

Table 6 Success factors contributing to the overall success in financing energy projects

Ranking/Success Factors (1 = most important; 11 = least important)	Average weight (1 = insignificant; 10 = crucial)				
	Total Sample (N=18)	FI[a]		PD/S[b]	
		Mal (N=3)	Thai (N=6)	Mal (N=4)	Thai (N=5)
1 Reliability of off-taker of product/service	8.94	9.33	9.17	9.50	8.00
2 Fuel supply/feedstock security	8.89	8.00	8.50	9.25	9.60
3 Proper mitigation/allocation of risks	8.11	9.33	9.17	6.75	7.20
4 Reputation/strength of sponsors	8.06	9.33	7.67	7.75	8.00
5 Commercial viability of the project	8.00	9.33	8.50	8.75	6.00
6 Technical feasibility of the project	7.67	9.67	8.33	8.25	5.20
7 Government support and regulations	7.17	8.00	5.83	7.50	8.00
8 Reliability of EPC contractor	7.11	8.33	7.50	7.00	6.00
9 Reliability of O&M contractor	7.06	8.33	7.83	6.25	6.00
10 Availability and sophistication of the capital market	5.12	4.67	5.40	5.75	4.60
11 Involvement of multilateral agencies	4.06	4.33	5.60	3.50	2.80
Financing Institutions only					
Careful structuring of contractual arrangements	8.00	8.33	7.83		
Proper project documentation (i.e. quality of due diligence materials)	8.00	8.67	7.60		
Guarantees from sponsors	7.00	8.00	6.40		
Project Developers/Sponsors only					
Choice of arrangers/financial advisers	6.33	6.00	6.60		
Healthy competition among lenders	4.78	4.50	5.00		

(a) financing institutions; (b) project developers/sponsors

Eleven major factors have been identified as critical in the successful implementation of these projects. The most important of these factors is the reliability of the off-taker. In Malaysia and Thailand, the national utilities are mandated to purchase from the renewable energy producers through a power purchase agreement (PPA). In Malaysia, the PPA is negotiated and normally lasts for 21 years. For Thailand, the PPA is based on standard formulas, and the duration of the contracts depends on whether the contract is on a "firm" or "non-firm" basis.

The financing institutions and project developers/sponsors in both countries believe that it is also crucial to secure the fuel supply/feedstock. As mentioned earlier, unlike conventional fuels such as coal and natural gas, it is quite rare for renewable energy projects to secure long-term fuel availability contracts.

Since the majority of the financing institutions in the two countries surveyed do not have sufficient prior experiences in funding renewable energy projects, they believe that these projects are quite risky. Thus, they put careful attention to proper mitigation and allocation of risks. It can be noted also that due to unfamiliarity with these types of projects, financing institutions require careful structuring of the contracts as well as proper due diligence. On the other hand, project developers/ sponsors believe that risks in developing renewable energy projects are manageable and can be allocated easily to the various participants in the project.

The differences in the scoring between financing institutions and project developers/sponsors in each country can be attributed to the level of maturity of the market. Currently there is still no grid-connected renewable energy project in Malaysia since the policy was only implemented in 2001. In Thailand, however, the grid-connected projects have been existing since the early 1990s.

2.4 Typical Structure

In order to determine the typical structure which the financing institutions and project developers/sponsors consider as sufficiently attractive for them to participate in the investment and/ or financing of renewable energy projects, the interviewees were asked indicate their companies' policy on certain parameters. The table below shows the results. The wide range of answers indicates the varied appetite of the companies for the different economic and financial parameters. It also reflects that there are many factors affecting their decision such as degree of risk aversion, size of company, sectors involved, and policy mandates.

Table 7 Typical structure of renewable energy projects

Parameters	Range of answers	
	FI[(a)]	PD/S[(b)]
Minimum project IRR	8% - 20%	13% - 20%
Minimum % of equity to total project cost	30% - 40%	-
Minimum debt service ratio in a given year	1.00x - 1.75x	-
Minimum average debt service ratio	1.00x - 2.00x	-
Minimum useful project life	* - 21 years	15 – 30 years
Minimum off-take/concession contract	* - 25 years	15 – 30 years
Minimum size of project in US$	0.02 - 50 million	5 – 10 million
Minimum Return on Equity	-	15% - 20%
Maximum % of equity to total project cost	-	20% - 30%
* should be longer than the maturity of the loan		

(a) financing institutions; (b) project developers/sponsors

3. FINANCING OPTIONS TO REMOVE THE BARRIERS AND FACILITATE THE FINANCING OF RENEWABLE ENERGY PROJECTS

At the moment, renewable energy projects being implemented in Malaysia and Thailand are not many due to existing barriers that prevent their widespread implementation. Among them are barriers related to the financing of these projects. These have been discussed in the previous sections. Appropriate and innovative financing mechanisms and support are needed to help facilitate the removal of these barriers.

Below are some of these mechanisms and support that have been discussed with financing institutions and project developers/sponsors and which are more likely to be suitable for these types of projects.

3.1 Bundling of smaller projects to achieve a critical mass

Many financing institutions, despite some superficial indication that they are willing to consider funding small projects, are reluctant to fund individual projects that are rather small. The classic reasoning for this is that it takes almost the same effort to conduct due diligence and process the documentation of a small project as a large one. Bundling of projects could help achieve a critical mass that would attract financing from lenders. Another advantage in this approach is the sharing of financing transaction costs, which could be prohibitive or even create a negative leverage if the transaction is made for a single project.

This approach does not come without drawbacks. As mentioned earlier, this approach has not been successfully demonstrated in developing Asia. If the projects that are bundled are not sufficiently similar, they could be perceived by financial institutions as having different risks and therefore, need to be evaluated individually. In this case, bundling them would not necessarily reduce substantially the efforts spent in evaluating and processing the projects.

Another issue related to this approach is that the financial institution should accept a diversified portfolio of different small-scale renewable energy projects. This would mean that they have to sacrifice some aspects of due diligence normally done for individual projects by having a simplified approval procedure such as, for example, a checklist approach. As such, the lenders should accept the "you win many, and lose some" result as opposed to looking for an almost secure condition when dealing with individual projects.

3.2 Mobilisation of institutional support to facilitate financing

One of the common perceptions of financing institutions is that renewable energy projects are very risky. This attitude stems from the fact that they do not understand the technology, they lack the in-house expertise to evaluate it, and they have not seen many examples of the same technology working in a similar environment.

Some of the institutional support that could be promoted to improve the perception and thereby raise the confidence of financing institutions towards renewable energy technologies include:

- *Arrangement of site visits and study tours to successful installations.* Examples of relevant projects that are successfully operating exist. By bringing key individuals from financing institutions and other relevant organisations to these installations and letting them see for themselves these technologies, would go a long way in changing their perception regarding the risks involved in these projects.
- *Capacity building of relevant organisations.* Providing support and funds to organise training and other activities that would develop the capability of the staff of financial institutions involved in the evaluation and approval process of projects could lead to enhanced confidence to consider

projects that are otherwise perceived to be too risky. An example of this activity is the creation and subsequent training of a multi-disciplinary team within the Development Bank of the Philippines to evaluate renewable energy projects, through the support of the UNDP/FINNESSE project.[2]

- Capacity building could also be initiated for project developers of small-scale renewable energy projects to develop skills in the financial packaging of projects.
- *Support for development of favorable policies and regulations.* Some of the barriers simply happen because of lack of policies and regulations favoring the implementation of small-scale renewable energy projects. These policies and regulations could include: creation of minimum operating standards, regulation for sales of electricity to the grid or third party, creation of policy to support a minimum lending mix by the banks to include renewable energy projects.
- *Creation of a standard regional rating system to evaluate the bankability of projects.* Due to the diversity of technologies involved in projects related to renewable energy, financial institutions cannot dedicate members of their staff to assess these different technologies. Moreover, even if on the operational level someone is somehow familiar with the technology, they are not confident to justify their decision to their top management. By setting up and establishing a standard rating system which is something like an equivalent of a Moody's or S&P for these types of projects, the confidence of financial institutions to consider them could be raised. Of course, lenders could and may still want to apply their own evaluation procedure as part of their due diligence process over and above the rating system.

3.3 Mobilisation of government funds dedicated to support the development and implementation of projects that are shown to mitigate greenhouse gases

An example of this initiative is a fund that the National Energy Policy Office (NEPO) of Thailand has dedicated to provide incentive for renewable energy projects selling power to the national utility. As a result of this incentive, applications have been received from projects totaling around 775 MW of capacity for sale to the grid. In Malaysia, a fund was launched in 1996 to provide subsidies specifically for small and medium sized industries (SMIs). Operating for already five years, the Cabinet has recently agreed to extend the fund for another five more years.[3] In another programme in Malaysia, the government earmarked 60 mil. RM (around 16 mil. USD) for a period of three years to promote the use of Empty Fruit Bunches, a waste from the palm oil mill, for energy generation. The support goes to the provision of technical assistance, provision of guarantee for the loan, buying down of the interest rate for a portion of the loan and a small research component.

3.4 Creation of local funds for participation in Renewable Energy Projects

A locally managed fund with participation from different relevant local and international players as well as from existing global funds could be created with the aim of participating in, and benefiting from, the implementation of the above projects. One area where benefits could be expected is in the potential income that could be gained through the participation of the projects in the Clean Development Mechanism (CDM) of the Kyoto Protocol.

The fund could be disbursed using several possible paths:

- *Participation in the equity.* Although it is not expected for the fund to take in a majority share in the project, providing equity in exchange for a pre-determined rate of return is a realistic approach for the fund to take. This is a welcome arrangement by developers who may either need additional

---

[2] Joint UNDP/World Bank Energy Sector Management Programme (ESMAP) and the FINESSE (Financing Energy Services for Small-scale Energy-users) Programme.

[3] New Strait Times, 29 November 2001

amount to top up their own funds, or may want to free up some portion of the available funds for other investment opportunities. Additional benefits for the fund could be the dividends coming from the project during its operation.

- *Provision of soft loans.* Depending on the ease of obtaining debt financing from conventional sources, and the terms of the debt, provision of funds for all or a portion (most likely the latter) of the debt requirement at a lower interest rate than the market, could attract project developers to borrow from local funds. In return, as in the previous case, this transaction would be in exchange for a pre-determined rate of return.
- *Advanced sale of certified emission reduction (CER) for up-front pre-investment capital.* In the case of projects that are eligible for CDM, by pre-selling all or a portion of the CER generated by the project activity, a project could have funds to pay for the development costs and possibly part of the capital expenditure of the project. The agreement could be structured to provide some up-front fees and the rest upon actual delivery of the CER.
- *Provision of credit guarantees.* The local fund could also be used to provide guarantees for the loans of the project. Instead of providing collateral or corporate guarantees, which could tie up valuable assets and/or cash of the developer company, the local fund could be used as a guarantee. Amounts could be capped so that the fund is not exposed beyond a certain percentage of the total fund committed to just one project.

4. CONCLUSIONS

- The countries of South East Asia have huge potential for implementation of renewable projects that can mitigate greenhouse gas emissions.
- There appears to be a realization among governments in South East Asia on the importance of renewable energy in contributing to sustainable development and environmental protection. This is reflected in some of the regulations and policies that have been or are currently being implemented in the different countries of the region.
- These technologies are not widely disseminated because some barriers for the implementation still exist. One of the barriers is in the area of financing.
- Many innovative financing mechanisms have been devised and several funding initiatives exist. These have been useful in helping stimulate investments in industrial projects involving renewable energy. However, the fact remains that in order to create market sustainability, projects should be able to easily obtain financing on a commercial basis, without full corporate guarantee or full recourse to the sponsors. Currently, there is a dearth of examples where this is actually happening.
- The participation of the private sector in the development and implementation of projects is crucial in the widespread dissemination and acceptance of projects involving renewable energy. Interviews among the stakeholders, particularly the financing institutions and project developers/ sponsors, revealed the barriers faced in their participation in the financing of these projects. The factors that have been identified as important in contributing to the success in financing these projects, as well as the suggested ways to mitigate their high perceived risks, would be useful for parties who are involved in the promotion of these technologies.

5. ACKNOWLEDGEMENTS

The contents are mainly based on the results of two studies conducted by the authors, namely, “Financing Issues and Options for Small-Scale Industrial CDM Projects in Asia” for UNDP-FINESSE, December 2001; and “Promoting Private Investment in Renewable Energy in Malaysia and

Thailand" for the Asia-EcoBest Programme of the European Commission, December 2001 and experiences by the authors in implementing biomass cogeneration projects supported by the EC-ASEAN COGEN Programme Phases 2 and 3.

6. REFERENCES

[1] Amulya K.N. Reddy; Robert H. Williams; and Thomas B. Johansson. 1997. Energy After Rio: Prospects and Challenges, 1997: Analyses the role of energy with respect to the objectives and commitments. In *the major UN Conferences.* United Nations Development Programme, United Nations Publications.

[2] Baumert Kevin A. and Nancy Kete with Christiana Figueres. 2000. Designing the Clean Development Mechanism to meet the needs of a broad range of interests. World Resources Institute, 20 p.

[3] COGEN, Asian Institute of Technology. 1998. Evaluation of Conditions for Electricity Production based on Biomass.

[4] Curtis Moore and Jack Ihle. 1999. Renewable Energy Policy Outside the United States. Renewable Energy Policy Project (REPP) 4.

[5] Flavin Christopher and Seth Dunn. 1998. Climate of Opportunity: Renewable Energy After Kyoto. Renewable Energy Policy Project (REPP) 11.

[6] GEF. Renewable Energy: GEF partners with business for a better world. 2001.

[7] Joint UNDP/World Bank Energy Sector Management Programme (ESMAP) and the FINESSE (Financing Energy Services for Small-scale Energy-users) Programme.

[8] Martina Rossi. 2001. Fast-tracking Small CDM Projects: Implications for the Electricity Sector. *OECD and IEA Information Paper*.

[9] Martinot Eric and Omar McDoom. 2000. Promoting Energy Efficiency and Renewable Energy: GEF Climate Change Projects and Impacts. Global Environment Facility (GEF).

[10] National Energy Policy Office of Thailand. 2001. Energy conservation press releases, http://www.nepo.go.th/encon/encon-Press25440528-1.html.

[11] National Energy Policy Office. 2000. Electricity Supply Industry Reform and Thailand Power Pool.

[12] New Strait Times. November 2001.

[13] Panayotou, T. 1994. Financing Mechanisms for Environmental Investments and Sustainable Development. *Environmental Economics Series Paper* 15. UNEP.

[14] Renewable Finance. Autumn 1997.

[15] Stewart, R. 2000. The Clean Development Mechanism: Building international public-private partnerships under the Kyoto Protocol.

[16] UNDP. 2000. Financial mechanisms and economic instruments to speed up investment in sustainable energy development. Report of the secretary-general, June 2000.

[17] UNDP. 2000. *Sustainable Energy Strategies: Materials for Decision-Makers*. New York: United Nations Publications.

[18] United Nations Economic and Social Council. 2000. Financial mechanisms and economic instruments to speed up the investments in sustainable development. Report of the Secretary-General.

[19] Wohlgemuth, N. 2000. Innovative financing mechanisms for renewable energy systems in developing countries. In *Sustainable development international. Strategies and technologies for local-global agenda 21 implementation*. London, ICG Publishing Ltd.: 37-42.