OPET-MEDNET

Information Document on Financing Mechanisms

for the Promotion of Energy Investments

Final

May 2004

EPU
N • T • U • A

Table of Contents

1. Introduction

Energy is essential for economic and social development. About ninety per cent of the world energy supplies are provided by fossil fuels, with the associated emissions causing local, regional and global environmental problems. Most energy projections show that current and expected future global energy demand patterns are not sustainable. Even when assuming massive improvements in energy intensity, total energy demand is also expected to increase. Long term projections indicate that world energy demand may increase dramatically, with most of this increase, taking place in developing countries. These trends indicate that, in order to comply with the necessary conditions for the three dimensions of sustainability (economic, environmental and social) with respect to energy production and consumption, a decoupling of economic activity from fossil primary energy consumption should be achieved.

In addition, the development of Renewable Energy Sources (RES) and Energy Efficiency Technologies (EET) is a central aim of the world energy policy in order to contribute in reducing greenhouse emissions. Furthermore, increasing the share of RES in the energy balance enhances sustainability and helps to improve the security of energy supply by reducing dependence on imported energy sources. [1]

RES and EET started to be developed when the oil crises of the 1970's made everyone aware of the fact that fossil resources would run out one day - but since there is some uncertainty about when that will actually happen the efforts made in this area remained rather tentative. Nowadays, growing environmental concerns and limitations in the exploitation of conventional energy resources have given new impulse in modern RES technologies. Beyond 2020, new technologies, such as hydrogen-based fuel cells and carbon sequestration, hold out promising prospects of plentiful, clean energy supplies for the world. So, RES projects and EET low impact on the environment will need to play a greater role in the future energy mix in order to achieve low-carbon intensive energy systems.

The efficient management of energy resources as well as the minimisation of environmental impacts, usually constitute important priorities of national and regional energy policies. Promoting Renewable Energy Sources (RES) and implementing RES projects is important component of national energy planning for sustainable development.

One of the major inhibits in implementing RES projects is the identification and securing of appropriate financing. The self-financing, the debt financing as well as the national substitution, cannot provide the necessary means for overriding the inhibits that the implementation of RES projects face [1]. It can be said that the process of application and dissemination of RES is moved slower compared to the technological development of RES. The reasons vary for each of the main concerned parties and they could be specified as follows: [1]

- **State**

  The energy sector is a priority of paramount importance for the state, due to the direct relation with the wider economical and social development of the country. However, the state cannot always place sufficient amounts for the modernisation of the energy sector through the promotion and penetration of renewable technologies.

- **Users**

  The users of energy often face the implementation of RES projects hesitantly. A pool of inhibits that justify this attitude, includes:

  - The high initial cost of renewable technologies in relation with the long time period of depreciation of the investment.

- ❖ The lack of available funds of the enterprises for the implementation of RES projects. In most cases the enterprises cannot allocate sufficient amounts of their budget in such projects, since they have to overcome more demanding priorities, such as the improvement of their competitiveness and the identification of new markets.
- ❖ The financial, technological and performance risks of these projects are often high for an enterprise related to the expected results.
- ❖ The lack of awareness regarding the performance of modern and innovative renewable technologies.

- **Investors – Funding Institutions**

  The specific character of these projects and the risks included often create problems to the investors regarding the reimbursement of their investments - loans.

It can be summarized that the use of innovative renewable energy technologies that will result in the modernisation of the energy sector, the contribution in energy savings and the decrease of GHGs emissions, face significant deterrents located to the financing of such projects. The high initial cost of such technologies combined with the risks that the user should undertake create the need of promoting and applying modern financial schemes. [2]

The application of modern financial mechanisms aims not only to overcome the inhibits appeared in the conventional forms of financing but also to provide motivations for the implementation of RES projects and the further development of renewable technologies. The most known financial mechanisms are the Third Party Financing, the Build-Operate-Transfer and the Venture Capital. [3]

The objective of this document is to present the financial mechanisms that help the promotion of RES and Energy Efficiency technologies. The document is structured along six parts, as follows:

- The first part is the introduction of the document.
- The second part is devoted to the description of the Third Party Financing.
- The third part is devoted to the description of the Build-Operate-Transfer.
- The fourth part is devoted to the description of the Venture Capital.
- The fifth part presents a review of the main financing programmes that help especially RES and Energy Efficiency develop and are being applied by international organisations and numerous non-governmental organisations.
- The last part presents the conclusions of the analysis.

2. Third Party Financing

2.1 Description

Third Party Financing (TPF) is one of the most promising financing schemes for the promotion of RES as well as energy efficiency.

The term of Third Party Financing was used for the first time in USA, where it was initially developed. This term changed by the time in Energy Performance Contracting, in order to better depict the benefits of the provided services and not only financing. In UK, TPF is known by the term Contract Energy Management, while in France it is referred by the term Contract de Resultat. However, in most countries the initial term TPF is still used. [4]

The general concept of TPF is the funding of improvements in the energy efficiency – energy savings of a plant or a process by an external Energy Service Company (ESCO), using the achieved energy savings to pay for that investment. There are many different approaches to Third Party Financing but they all share the following common elements [5]:

- The investment is made by an outside energy service company (ESCO) with no up-front capital required by the energy user.
- The energy savings produced, viewed as a stream of income, are used for the repayment of the investment and provided services of the ESCO, for a specific time period.

Third Party Financing was developed to help companies finance investment without affecting their balance sheets. The user of efficient energy technologies does not have to finance the initial outlay that is required for the realisation of the energy efficiency improvement. In contrast, ESCO undertakes fully the financing, design, development and operation of the project. Instead, the investment is reimbursed by payments related to the performance of the technology installed for a specific time period, specified in the contract. Third Party Financing always entails a series of services, including technological assistance and in-house energy audits.

The user therefore does not have to concern with technological considerations. The ESCO provides a combination of engineering, financial and marketing skills, carrying out detailed energy audits and choosing appropriate reliable technologies for making the planned energy savings, since the reimbursement of its investment is directly related to the performance of the project. The general concept of TPF is presented graphically in Figure 1.

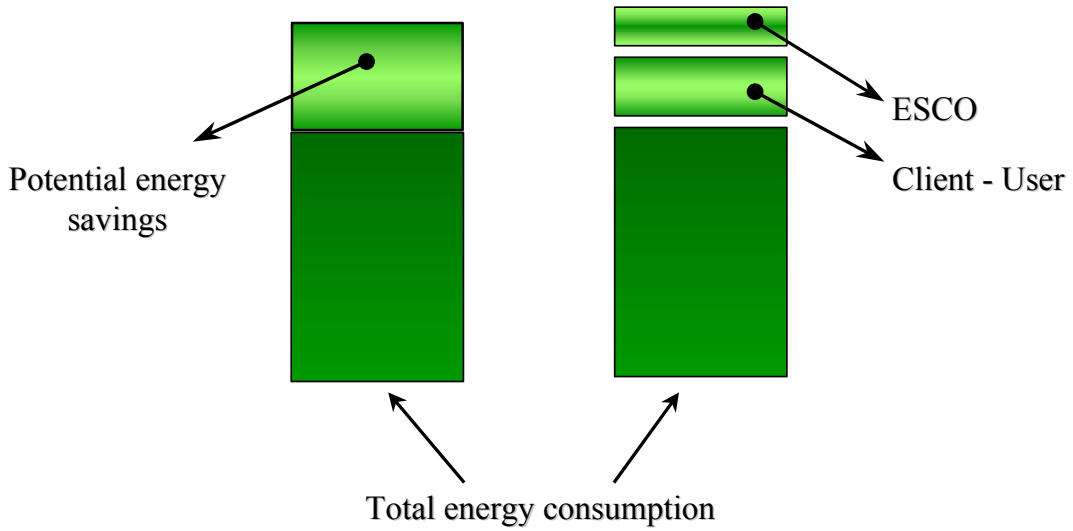

Figure 1. The concept of Third Party Financing

The following parties are involved in the Third Party Financing operation:

- Energy Services Company (ESCO). This is the entity that promotes and runs the project, and that takes responsibility for the Technical and Financial risks.
- User (who owns the installations in which the project is carried out). It is the client of the ESCO.
- Financing Agent. This is the entity that finances the project through the ESCO. In many cases the financing agent is the ESCO itself.

The contractual relations between the ESCO and the user are determined by a contract, which must cover:

- All negotiable conditions.
- The scope of the project.
- The way the savings will be evaluated (considering production, quality, raw materials, the period of time the ESCO will take part in the investment, etc.).
- The time period that the ESCO will exploit the project.
- Other general legal clauses to assure the rights of each party.

The most commonly used TPF contracts are the "Shared Savings", the "Guaranteed Savings" and the "First Out". The Shared Savings contract foresees the sharing of savings, during the contract period, between the ESCO and the user. The percentages of the sharing between the two involved parties is agreed at the beginning and could be altered depending on the performance of the investment. The Guaranteed Savings contract implies that the savings that will be achieved by the investment is known by the beginning of the agreement and is guaranteed by the ESCO. Within the framework of the last contract, which is widely spread in Canada and is the typical form of TPF, the ESCO exploits all the savings achieved by the investment for the time period of the contract. [2]

2.2 Benefits and Barriers

The benefits provided through TPF contracts are not only related to the securing of financing but also to the provision of a number of services that minimise the risks that the user should otherwise undertake. More specifically, within the framework of TPF contracts, ESCO undertakes the identification of the investment required and secures the financing of the project. Thus, the beneficiary preserves its equity and lines of credit. The investment does not generally appear as a commercial debt and in no way affects the customer's financial independence ratios. Cash-flow forecasts do not have to take account of the success or failure of the project. There is a direct link between the savings made as a result of the investments and the amount of the reimbursements, which is never the case with a conventional loan. Additionally to the securing of the financial resources, ESCO provides the customer with advice and services to carry out a project. It will assume a number of responsibilities, including the identification or the required technology, the installation and operation of the project. [2]

Generally there are no significant problems for the user. On the contrary, ESCO has to face technical and financial problems, including:

- Results different than those expected.
- The setting up of the project takes longer than expected.
- Other parameters including: raw materials, type of products, production cycles etc.
- Any financial problems suffered by the user, may result in delayed payments to the ESCO.

3. Build-Operate-Transfer (BOT)

3.1 Description

The first official private facility development under the name "Build Operate Transfer" was used in Turkey in 1984, as part of an enormous privatization program to develop new infrastructure (Beuker, 1988). However, the BOT approach was used as early as 1834 with the development of the Suez Canal. This revenue-producing canal, financed by European capital with Egyptian financial support, had a concession to design, construct, and operate assigned to the Egyptian ruler Pasha Muhammad Ali (Levy, 1996).

In the second half of the nineteenth century, railways and roads were developed with the help of private financing in the western world (Mobsby, 1992) and although the privately operated public facilities became financial successes, they were not devoid of shortcomings. The infrastructure projects had to be accessible to everybody but optimizing the economic rate of return conflicted with public interest. By the mid-twentieth century, the privatization of public facilities had experienced a downturn as the development of infrastructure projects by private funds gained popularity throughout the world, particularly in the United States.

In Europe, however, infrastructure projects remained under governmental jurisdiction as they were considered public requirements the state had to provide. Since the 1990s, the attitude of European countries has changed to include more privatization in their infrastructure development, especially in France and Britain where privatization was extensive, in order to fulfill public needs. At the same time, Asia was experiencing an economic boom that opened the doors for new forms of project delivery, based on the principle of privatization. Ernst and Pham (1994) refer to privatization as a process in which the delivery of goods and services, usually administered by the government, is shifted to the private sector. Privatization can be divided into primarily three areas: the selling of governmental holdings (i.e., British Airways and British Telecom), the subcontracting of government services to private undertakers (i.e., US Postal Service, park maintenance), and the subcontracting of financing and developing public facilities (i.e., Channel Tunnel). BOT belongs to the last case. [5]

BOT (Build-Operate-Transfer) is a relatively new approach to infrastructure development, which enables direct private sector investment in large-scale projects such as roads, bridges and power plants. The theory of BOT is quite simple: [6]

- Build: A private company (or consortium) agrees with a government to invest in a public infrastructure project (such as a road or power station). The company then secures their own financing to construct the project.
- Operate: The private developer then owns, maintains and manages the facility for an agreed concessionary period (eg. 20 years) and recoups their investment through charges or tolls (eg. road tolls or electricity sales).
- Transfer: After the concessionary period the company transfers ownership and operation of the facility to the government or relevant state authority.

The BOT scheme also includes a number of variations:

- Build-Transfer Scheme: The contractor undertakes the construction, including financing, of a given infrastructure facility, and its turnover after completion to the public-sector body concerned which pays the contractor its total investment expended on the project, plus a reasonable rate of return. This arrangement may be employed in the construction of any project, including critical facilities which, for security or strategic reasons, must be operated directly by the Government.
- Build-Transfer-Lease-Operate Scheme: The public-sector body concerned is the direct borrower which leases back the infrastructure to the contractor at a rate matching the amortisation schedule.
- Supply-Operate Scheme: This is an arrangement where, if the interests of the Government so requires, the supplier of equipment and machinery for a given facility operates the facility, providing in the process technology transfer and training.

In its most basic form, a BOT project is one in which a Government grants a concession for a period of time to a private company for the development of a project. The private company then builds the project to the specifications agreed, operates and manages the project for a number of years after its completion. This gives the private company the chance to recoup its construction costs and make a profit out of the proceeds coming from the operation and commercial exploitation of the project. At the end of the concession period, the rights of the project company in the project are transferred to the Government or its designee, normally free of any charge. Then the government is free to operate it itself, or contract its operation to another contractor (or even to the same contractor).

In this arrangement, the repayment of any loans or returns on the investments made on the project is not guaranteed by the Government, but depends on the revenue generated by the project. Since direct funds from the public budget are not required, the host Government will thus experience reduced pressure of public borrowing, while allowing the transfer of the industrial risks and also of new technologies to the private sector. Furthermore, since the project is built and, during the concession period, operated by the consortium, the Government gains the benefit of private sector expertise in these areas.

Although BOT projects have largely been used in the development of large infrastructure projects such as telecommunications networks, highways and other public transportation projects, port facilities and in energy supply, increasingly it is also being utilised for medium and small scale projects. Thus, the potential exists for BOT to provide added opportunities for increased international trade too.

Typically, the main parties in a BOT project would be: the project company (or concession company or promoter), the government, the government agency, the investors (or sponsors), the lenders, the contractor (construction company), the operator and the suppliers. This multiplicity of parties and their interrelated contractual relationships give rise to complex and time consuming variably negotiations. Furthermore, the lack of

expertise in putting together a BOT project, particularly within Governments, acts as a hindrance in the negotiating process. The structure of a BOT project is presented in Figure 2.

It is vital to consider the overall legal environment in which the project is to be executed. There will often be enabling legislation that establishes the concession. One of its most important functions will be to confer and then regulate the right of the concession company levy forms of revenue from users of the project facility.

Among the main characteristics that differentiate BOT projects from other forms of project implementation are that the Government does not provide guarantees for the loans for the financing of the project, which necessitates non-traditional distribution of risks between a high number of contractually interrelated parties.

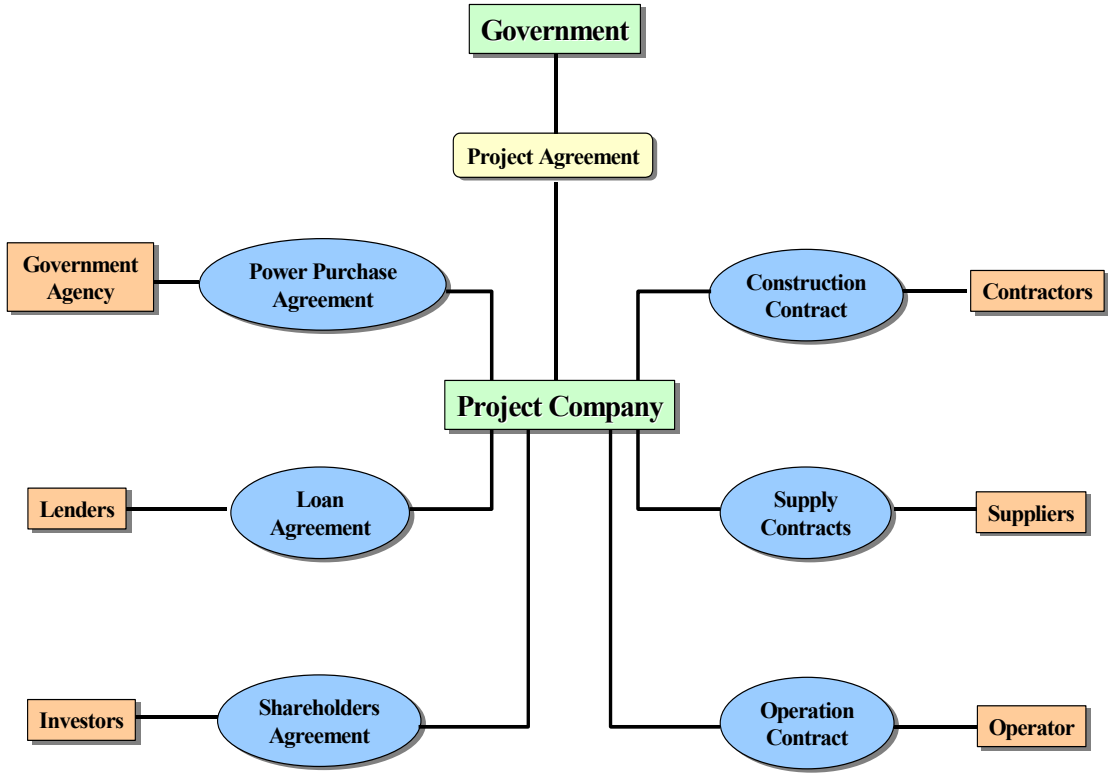

Figure 2: The Structure of BOT

The fact that the responsibility for repayment of any loans shifts from the traditional "client" (the Government) to the private consortium implies an increased risk to the lenders. Lenders are therefore placed in a situation where they have to look for additional means of reducing their risks, including insurance and long term contracting. In general, because of the size and the nature of BOT projects, there is a great deal of uncertainty involved generating risks (political, construction / completion, operational, etc.) This element of non-traditional distribution of risks between the various parties makes the pre-contractual stage of a BOT project usually fairly complex. [7-13]

3.2 Benefits - Barriers

Although the benefits of BOT are directly depended to the specific project and its economical environment, there is a number of general characteristics that make them attractive:

- Countries are provided with an opportunity to finance projects without involving public funds.
- Countries are benefited by the expertise and experience of the concession company.
- Investment, construction and technological risks are shifted to the concession company.
- Investments are stimulated and privatisation is promoted.

The main barriers that often arise in BOT agreements are related to financial uncertainties, technical problems and legal and political disputes. One of the main barrier in establishing BOT projects is the lack of legal certainty in some States regarding the realisation of particular aspects of a project. It might not be clear as to what extent private entities may draw revenue from the operations of public infrastructure projects. In other instances, there might be lack of clarity as to the basis and effect of certain construction and long-term contractual assurances that the Government would need to make to the private consortium. Enabling legislation to make the underlying legal framework attractive for BOT projects is therefore imperative. [10-13]

4. Venture Capital

4.1 Description

The venture capital function of a capital market provides investment funding for relatively high risk but often-innovative research that may eventually lead to the development of new companies that produce and market innovative cost-effective sustainable energy technologies. The venture capital segment of the capital market has received a significant amount of attention lately due to a large part to the extremely high rate of growth in venture capital investments and the number of venture capital companies and significant absolute amounts of risk capital employed during the Internet and E-commerce boom of the late 1990s. Historically, venture capital and all forms of new venture financing have played a critical role in new business formation and technological transformation.

A typical energy venture capital fund management company is staffed with people who have operational experience in the energy industry, with both technology and management backgrounds. Technology specialists and financiers may complement the competencies of the energy experts. Alternatively, a venture capital company that does not specialize in energy (“generalist”) will retain a smaller staff of individuals who may have some expertise in energy but may also be responsible for other sectors. These generalist venture capitalists often work with consultants on specific investment projects, whereas a specialized energy venture capitalist would rather rely on in-house expertise.

The typical energy venture capital investment model follows a straightforward asset allocation process: establish objectives, examine the financial, economic, political and social conditions, and finally construct the portfolio and monitor performance. A typical energy venture capital investment process is shown in figure 3 below.

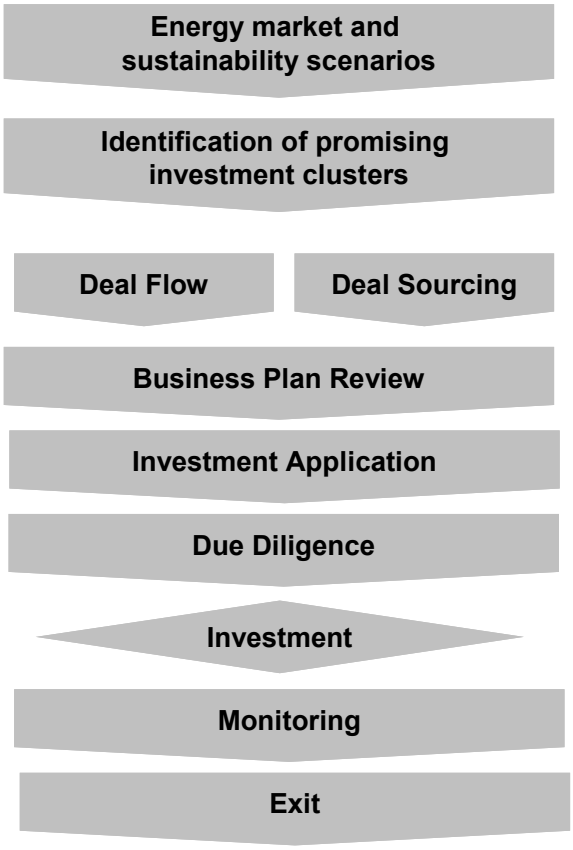

Figure 3: The Structure of Venture Capital

Most energy venture capitalists start out with some sort of market analysis that may also include a scenario analysis of energy and sustainability trends. As a result, the venture capitalist identifies certain investment clusters (technology and service sectors) that he considers promising in terms of growth potential. Within these clusters, the venture capitalist both actively sources deals (e.g. by hosting or attending venture fairs and industry conferences, doing internet searches) and passively receives deal flow (i.e. venture companies send their business plan and request for funding). The business plans of ventures that fit the venture capitalist's investment profile are then reviewed and discussed within the team. If the initial analysis is positive, an in-depth assessment leads to an investment application that is submitted to the Board of Directors or Investment Committee of the fund. In case of a positive decision, the venture capitalist proceeds with a due diligence process, and finally makes an investment in the company. The ratio of actual investments to total deal flow is typically in the 1-2 percent range, that is of all the business plans received, 98-99 percent of the funding requests will be rejected. After the investment is made, the venture capitalist actively works with the entrepreneurs to grow the company. This is particularly true in the case of a specialized energy venture capitalist that will typically get a board seat in the company. Finally, at the end of the investment cycle, typically after 5-8 years for early- and expansion stage investments or 1-2 years for pre-IPO investments, the venture capitalist exits the investment either through an IPO or a trade sale.

4.2 Benefits - Barriers

Energy venture capital companies invest in a wide range of innovative energy projects all along the electricity value chain. The overall theme of these investments is consistent with strategies to improve the efficiency of power systems or to reduce the use of fossil

fuels by switching to more environmentally benign sources of power. In addition, all forms of RES (wind, solar and biomass. R&D, manufacturing, distribution, installation, operations and maintenance possibilities) are included.

Europe and the US (as well as other countries throughout the world) have had significantly different experiences with venture capital markets. In the US, venture capital has played a significant role in facilitating the activities of entrepreneurs and in the formation of new businesses since the late 1940's. Venture capital is "uniquely American" according to some experts. In Germany, on the other hand, an effort to create a national venture capital market launched in 1975 failed miserably. More recent experiences with the Neuer Markt have not faired much better. And as indicated by Gilson, the specific conditions necessary to sustain a well functioning venture capital market in the US may not be replicable in other countries for various reasons. The governments of other countries (e.g., Israel and Chile), however, have had more success than Germany in creating national venture capital markets.

Over the past 10 years a number of new venture capital funds have emerged in Europe and North America that are specifically targeting sustainable energy technologies as an investment theme. A significant number of such venture capital firms now exist. For example, the Financing Sustainable Development Energy Directory lists, as of July 15, 2003, over 50 firms willing to consider private equity investments in a full range of sustainable energy projects including all forms of renewable generation and energy efficiency. Alternative sources of data yield different lists and we expect to eventually find well over 100 firms that now make private equity investments in renewable and sustainable energy projects and young companies. The supply of venture capital is influenced primarily by the availability of an IPO. The influence is significant and most dramatic on late stage versus early stage venture capital investments. That is, the existence or absence of a viable IPO market most significantly influences the provision of late stage venture capital.

Venture capital, innovation and entrepreneurs are logically connected. A study published in 1998 looked at twenty industries over a three-year period of time and found that "the amount of venture capital activity in an industry significantly increases its rate of patenting" and that venture capital may have a larger influence on innovation than corporate R&D programs. These general conclusions are supported by research conducted with German companies where the results show that "venture capital has a significant positive influence on the number of patent applications in Germany." Clearly, there seems to be a significant role for venture capital to play in promoting innovation. [15]

5. Review of Financial Mechanisms to Promote Energy Investments

An overview of innovative mechanisms to promote energy investments especially in RES technologies is given in this section. [16]

5.1 The World Bank

The World Bank has estimated that developing countries alone over the next four decades will require five million megawatts of new electrical generating capacity to meet anticipated needs. Nowadays, several international and national programmes of the World Bank are involved in promoting RES in various countries. More analytically:

- The Asia Alternative Energy Program (ASTAE) was established in 1992 to promote RES and Energy Efficiency in Asia through the World Bank's power sector lending operations. To support this goal, ASTAE works with both Bank staff and client country decision-makers to incorporate alternative energy options into the design of energy sector strategies and lending operations for all the Bank's client countries in Asia. Since its inception, ASTAE has generated substantial momentum, increasing the lending portfolio for alternative energy projects in Asia from about 2,0 million $ in financial year (FY) 92 to over 1,2 billion $ (FY93-FY00).
- The Solar Development Corporation (SDC), conceived as a freestanding commercial enterprise, is being established by the IFC, the private sector arm of the World Bank. Its primary objective is the development of viable, private sector business activity in the distribution, retail and financing of off-grid PV applications in developing countries.
- The Prototype Carbon Fund (PCF) has also been launched by the World Bank after Kyoto. The fund will buy carbon offsets at a competitive price and ensure that buyers and sellers of off-sets receive a fair share of the value added. The price of the carbon offsets would cover the cost of additional emissions reductions and also include a margin to share the benefits from the offset between the investor and host.
- The IFC's Renewable Energy and Energy Efficiency Fund (REEF) is expected to be the first global fund dedicated to investing in private sector renewable energy and energy efficiency in developing countries. The fund is expected to provide 150-210 million $ of private and IFC capital for financing on/off – grid projects of less than 50 MW.
- The Photovoltaic Market Transformation Initiative (PVMTI) is a 30 million $ fund operated by the IFC. This will be used to accelerate the growth of PV markets in India, Kenya and Morocco by providing leverage to private companies on a competitive basis.
- The Small and Medium Scale Enterprise Program (SME) is a 21 million $ activity of IFC supported by Global Environment Facility (GEF). It finances biodiversity and/or climate change projects carried out by small and medium scale enterprises in GEF-eligible countries. Contingent loans are provided to financial intermediaries (FIs).

5.2 United Nations Development Programme

UNDP has an Energy and Atmosphere Programme (EAP), a component of which is focused on energy issues including promotion of RES and Energy Efficiency through such activities as the joint UNDP/World Bank Energy Sector Management Programme (ESMAP), the FINESSE (Financing Energy Services for Small-scale Energy-users) programme and building linkages with the UNDP-GEF unit on Energy Efficiency, RES and greenhouse gas issues.

The EAP completed the UNDP Initiative for Sustainable Energy (UNISE) in 1996. UNISE is based on the fact that traditional approaches to energy make energy a barrier to socio-economic development and are not sustainable. RES was one of the focus areas in the UNISE. Other global programmes and initiatives related to RES within the EAP included operationalisation of UNSIE in various countries through diff e rent projects, and RES and rural electrification programmes to disseminate and commercialise renewable energy to provide rural energy services. RES issues a re also addressed in other programmes as a part of promotion of sustainable energy policy by the UNDP.

5.3 Joint initiatives by international agencies

Several initiatives by international agencies are involved in promoting RES in various countries. More analytically:

- Global Environment Facility (GEF) funds projects that provide global environmental benefits and local development gains in developing countries. The GEF provides grant financing to mitigate greenhouse gas emissions and projects covered in this component are targeted at lowering barriers to the success of renewable energy and energy efficiency technologies. The World Bank, UNDP and UNEP are the executing agencies for GEF projects.
- The Energy Sector Management Assistance Program (ESMAP) is a global technical assistance programme sponsored by UNDP, the World Bank and bilateral donors. Renewable energy projects are an important component of the ESMAP. The programme also features innovative financing mechanisms such as the solar PV concession systems for Argentina. ESMAP has reached to the poorest in Africa also through its micro PV lantern demonstration projects.
- The Renewable Energy Partnership (REP) Programme is being proposed by the World Bank and the Global Environment Facility (GEF) to provide increased and more flexible Bank and GEF funding to emerging market countries that make serious commitments to renewable energy development. The key to the eligibility will lie in making a RES - friendly policy, regulatory changes and other steps to foster RES development.

5.4 Non - Governmental Organizations

Several international and national NGOs are involved in promoting RES in various countries. They have developed innovative financing mechanisms to support the RES on a sustained basis.

- E & CO's mission is to promote developing country energy enterprises that create economically selfsustaining energy projects; use environmentally superior technologies and produce a more equal distribution of energy, especially to the poor. To this end E & CO participates in enterprise development to share risk and leveraging funding from conventional sources. E & CO was conceived by the Rockefeller Foundation to address the barriers in promotion of renewable energy and energy efficient technologies in developing countries. E & CO provides small loans, technical assistance, intermediary services and direct investment for:
  - Innovative implementation of a proven technology.
  - Technology innovation that is high risk by nature but shows potential for innovation in energy production.
  - Promoting new energy supply techniques in rural areas where end-users of energy have poor ability to pay.
  - Innovative financing (including credit, loan and equity) of energy enterprises to provide cost effective energy services to potential end users currently without access to such services.

- Enersol Associates, Inc. is a non-profit organization promoting use of solar energy for rural development in developing countries. Enersol has created a solar fund (Fondo Solar), which helped NGOs in Dominica and Honduras to raise finance for solar energy development. NGOs can secure commercial bank loans in local currency guaranteed with Fondo Solar funds. This familiarised NGO implementers and rural beneficiaries with credit procedures, and also helped the formal banking sector's forays into this area. Enersol has helped develop a local network of independent local enterprises, which sell, install, and maintain solar-electric systems in rural communities of the Dominican Republic and Honduras. The entrepreneurs are provided with training and technical assistance. The micro-enterprises in the Dominican Republic have installed over 6.000 PV systems, which provide electricity to rural homes, farms, schools, businesses, community centres and health clinics. The financing of these systems was arranged through the NGOs. [17]
- Grameen Bank (i.e. Village Bank) in Bangladesh is well known for its small-scale rural credit schemes. The Bank has now initiated a programme to finance renewable energy in rural areas, that constitute 85% of the country 's population, most of it without access to electricity. The Bank has established Grameen Shakti, a not-for-profit rural power company. Grameen Shakti is preparing a financing scheme for development of solar PV systems, wind turbines and biogas.
- Decentralised Energy Systems India Private Limited (DESI Power) is experimenting with the concept of Independent Rural Power Producers (IRPPs) in India. The company plans to enter into joint venture agreements with village communities or local entrepreneurs to set up small power plants of 100 to 500 kW capacity utilising local renewable energy sources. It will also be open to financing inputs from socially responsible funding sources and ethical/commercial investors elsewhere.
- The International Fund for Renewable Energy and Energy Efficiency (IFREE)'s goal is to promote the sustainable use of renewable energy and energy efficient technologies in less developed and transition economies. IFREE provides a part of the pre-investment funding to share the risk of project development with private sector companies for commercially financeable projects.

6. CONCLUSIONS

RES and Energy Efficiency technologies constitute very important factors to sustainable development. Growing environmental concerns and limitations in the exploitation of conventional energy resources have given new impulse in modern RES technologies. Despite the fact that RES provide a series of benefits in national and private scale, the development and dissemination process of such technologies has been slower than expected. The potential of RES resources is significant. Theoretically they could provide a multiple of current world energy demand. However this theoretical potential cannot be tapped with given technologies, only the technological potential. Economics prevent the technological potential from being realised. In reality the actual market penetration of technologies is even below their economic potential.

The use and promotion of renewable technologies is inhibited by a number of factors. The most important factors are the high initial cost, the financial, technological and performance risks, the scarcity of investment capital and the investing priorities of private companies. The application of TPF could facilitate the development of RES projects both in national and private level, through the enhancement of the wider public and private use of renewable technologies, the penetration of RES into the power supply system as well as the support of concerned industry. The TPF could enhance the use of renewable technologies in economical

sound countries or areas but also in developing countries and rural areas, where the investment scarcity for such technologies is more evident.

- **Enhance the wider use of renewable technologies**
  The use of renewable technologies in both private and public sector could be facilitated by the use of Third Party Financing. The factors that often inhibit the use of modern renewable technologies are covered through TPF contracts, under which a private company undertakes the financial, technological and performance risks of RES projects. Under this concept, RES units for the production of electricity could be installed in private companies (i.e. industries) or public organisations (i.e. hospitals), such as the installation of biomass units, PV units or even small hydro power plants and wind farms. Renewable technologies could be supported by the use of TPF contracts, since the motivations (financial and technical) offered by the ESCO, through a series of services, make the installation of RES units attractive to the client-user.

- **Enhance the penetration of renewable technologies into the power supply system**
  In many countries renewable energy sources constitute indigenous energy resources that could provide a series of advantages in the optimisation of the power supply sector as well as in the reduction of GHGs emissions. However, the high initial costs of such technologies and the national budget limitations, often hinder the sufficient enhancement of renewable technologies into the national power supply system. TPF could be used for the implementation of large infrastructure projects as well as minor ones. Through TPF, an ESCO can undertake the financing, construction and operation of a power plant such as hydro power plant, wind farm or desalination unit. The benefits of TPF, outlined previously, could facilitate the penetration of renewable technologies into the national power supply system, without the mobilisation of capital from the public budget.

Modern financial mechanisms could contribute to the further enhancement of development of renewable energy technologies and their wider application. More specifically, in recent years, a growing trend emerged among governments in many countries to solicit investments for public projects from the private sector. The main reasons for this trend are a shortage of public funds and a handsoff approach of government agencies. The Build Operate Transfer approach (BOT) is an option for the government to outsource public projects to the private sector. With BOT, the private sector designs, finances, constructs and operates the facility and eventually, after a specified concession period, the ownership is transferred to the government. Therefore, BOT can be seen as a developing technique for infrastructure projects by using private initiative and funding. Such infrastructure projects could include a wide array of public facilities with the primary function to serve public needs, to provide social services and promote economic activity in the private sector.

Nowadays, several financing mechanisms programmes for renewable energy developers and end users have been devised and tested by international organisations, governments and NGOs to promote RES. As a general policy, there is a move away from the traditional government-and subsidy-centred approach to promoting renewable energy to the new, market-oriented approach in which consumer-side financing or fee based service is the key issue.

REFERENCES

1. European Commission, Directorate General for Energy – DG XVII, Guide to Energy Efficiency Bankable Proposals (1993).
2. International Energy Agency and European Commission and Portugal's Direccão-Geral de Energia, Investing in Energy Efficiency: The Role of Third Party Financing, Conference Proceedings, OECD Publications (1994).
3. Gregory J., Silveira S., Derrick A., Cowley P., Allinson C., Paish O., Financing Renewable Energy Projects. London: Intermediate Technology Publications, 1997.
4. "New Organizational Forms in the Construction Industry", HBS-case, February 20, 1991.
5. Prof. Drs. Ir. Sebastiaan and Prof. Spiro N. Pollalis, "Case studies on build operate transfer", 1997. Delft University of Technology, The Netherlands.
6. United Nations Industrial Development Organisation, "Guidelines for Infrastructure Development Through Build-Operate-Transfer (BOT) Projects". Vienna: UNIDO Publications, 1996.
7. Anthony Pearce, "Documents from International Development & Strategies: Financing-BOT projects", International Development & Strategies, 2000
8. Jeffrey Huang and Rick Huijbregts, "Information Technology for Project Management in the Build Operate Transfer-approach", Harvard Design School, 1999.
9. "BOT Projects, New Schemes to Build a Future", ENR 1995.
10. Alberto Diaz-Hermidas, "Managing Change and Conflict in Architectural Projects: Four pavilions in Seville's Expo '92", Harvard Design School, Cambridge, MA, 1994.
11. Arjan Bol, "Naar een theoretisch model voor de BOT-benadering", Thesis research, University of Technology, Delft the Netherlands, March 1995.
12. Lotte Verhoeven, "BOT in Nederland", Thesis research, University of Technology, Delft the Netherlands, 1997.
13. Stephan Chon, "De financiering van Build Operate Transfer", Thesis research, University of Technology, Delft the Netherlands, December 1995.
14. Marjan Klein, "Build Operate Transfer (BOT) - een theoretisch model", Thesis research, University of Technology, Delft the Netherlands, 1996.
15. William H. Moore, Jr. and Dr. Rolf Wustenhagen, "Innovative and Sustanable Energy Technologies: The Role of Venture Capital", The Institute for the Economy and the Environment University of St. Gallen, Switzerland, 2003.
16. Norbert Wohlgemuth, "Innovative Financing Mechanisms for Renewable Energy Systems in Developing Countries", UNEP Collaborating Center on Energy and Environment, Denmark, 2004.
17. Kagiannas et al., Modern Financial Mechanisms for Renewable Energy Technologies, Euro Conference: New and Renewable Technologies for Sustainable Development, Madeira, 26-29/6/2000.