As experience with developing new technologies all over the world has shown, Government support and incentives are required to introduce and then promote the widespread application of renewable energy technologies.

Countries that have been leaders in renewable energy technologies for the last 30 years have used various support and incentive schemes, such as:

- Implementing special programs and demonstration projects;
- Granting soft loans for acquisition of renewable energy equipment and partial return of consumer investments;
- Accelerating depreciation of renewable energy equipment;
- Granting tax exemptions and lowering tax rates, taxing fossil fuels with high $CO_2$ emissions, taxing electricity produced using fossil fuels;
- Subsidizing investments in renewable energy sources;
- Adopting laws governing conditions for access to energy systems by plants operating on renewable energy sources;
- Setting special guaranteed rates for buying electricity produced using renewable energy sources and placing obligations on power grids to buying such electricity;
- Determining the mandatory share that electrical utilities generating electricity using renewable energy sources have in the overall energy balance;
- Financing R&D and design work resulting in lower renewable energy sources costs; and
- Establishing governmental and other kinds of institutions to promote the widespread use of renewable energy sources.

The renewable energy investment goals and types of renewable energy investments determine which mechanism is used. Effective support and incentive schemes can be divided into four basic categories:

- Support mechanisms and incentives for Independent Power Producers (IPP) – investors that are not part of the government or an energy utility – are the optimal way to meet renewable energy development goals;
- Renewable energy development incentives for energy utilities and government bodies;
- Mechanisms for attracting foreign investments; and
- Mechanisms for attracting renewable energy development investments for small cooperatives.

The Kyoto Protocol's CDM has recently become an option for stimulating renewable energy investments (Box 4.1). However, the CDM does not allow for full renewable energy technology project financing because the negligible "carbon" credits it grants for the sale of greenhouse gas emissions reductions cover only a small part (in most cases 10-15% of total expenditures) of investment costs.

## 4.1. Independent power producers

The Independent Power Producer investors tend to be industrial and agricultural enterprises as well as consumer cooperatives. The Specialized Enterprise Uzsuvenergo is an example of an independent power producer in Uzbekistan.

It is important to keep in mind that policy tools to stimulate investments by an Independent Power Producer in renewable energy are unworkable without the legislative regulatory framework granting Independent Power Producers entry in one form

Box 4.1

**The Clean Development Mechanism of the Kyoto Protocol – new possibilities for renewable energy**

Global warming of the Earth is most frequently associated with increased concentrations of greenhouse gases in the Earth's atmosphere due chiefly to people's use of fossil fuels. The ultimate goal of the UN Framework Convention on Climate Change (FCCC), adopted in 1992 and acceded to by Uzbekistan in 1993, is to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would preclude dangerous anthropogenic impact on the Earth's climate.

To achieve this goal the Parties to the Framework Convention are obligated to undertake measures to reduce greenhouse gas emissions or to contribute to their reduction to the extent it is possible for them to do so.

Although Uzbekistan has assumed no quantitative obligations to reduce greenhouse gas emissions, it nevertheless considers it expedient to pursue a policy aimed at achieving the goals of the UN FCCC. To that end, greenhouse gas emissions and discharges have been inventoried, the first national statement of the Republic of Uzbekistan on climate change was drafted, and a number of international projects on climate change issues have been implemented, including one on technology transfer of so-called clean technologies.

Annex I to the Kyoto Protocol to the FCCC, adopted in 1997, imposes on the majority of developed countries specific obligations to reduce their greenhouse gas emissions. Between 2008 and 2013 these countries are obligated to reduce their overall total greenhouse gas emissions, at a minimum, to 5% less than what they were in 1990.

The Kyoto Protocol provides a special market mechanism, the Clean Development Mechanism (CDM), as a tool for developed countries to create the economic conditions for fulfilling their obligations to reduce their greenhouse gas emissions and to stimulate processes restraining the growth of greenhouse gas emissions of developing countries. The CDM allows developed countries to carry out technical projects designed to lower greenhouse gas emissions in developing countries and countries with economies in transition.

Uzbekistan, in accordance with the Kyoto Protocol, is eligible to participate in the CDM and thereby attract additional foreign investments in its economy - "carbon" credits from the sale of greenhouse gas emissions reductions which can be used to introduce ecologically clean technologies, including renewable energy technologies.

The principal mandatory conditions for participation in CDM projects are:

- Ratification of the Kyoto Protocol;
- Establishment of a CDM Designated National Authority; and
- Voluntary participation in CDM projects.

Uzbekistan ratified the Kyoto Protocol in 1999. When it completes the process, now underway, of developing the institutional and legislative framework for implementing the provisions of the Protocol, the Republic will be able to participate effectively in the implementation of future CDM projects.

or another to the electricity market. The first step that needs to be taken in this direction is to create conditions favorable to all Independent Power Producers and renewable energy technologies so that the incentive policy tools, described below, can be effective.

There are two strategic policy tools that are recognized throughout the world that have encouraged Independent Power Producers to enter renewable energy markets in many countries. The first are laws obligating energy utilities to purchase electricity produced using renewable energy sources and the second is a tendering system used to select the best price through competitive bidding. These two policy tools can be used to maximum effect when used in conjunction with other (secondary) incentives.

## *Laws obligating energy utilities to purchase electricity produced using renewable energy sources*

Laws obligating energy utilities to purchase electricity produced using renewable energy sources have been used extensively in Europe and have met with particular success in Denmark, Germany and Spain. China's current rate structure for wind energy is regulated by a law obligating energy utilities to purchase electricity produced using wind-driven generators.

Historically Denmark's special rate for electricity produced using wind energy was set at 85% of retail electricity prices. The rate was based on and supported by requisite policy and strategy, including capital subsidies, tax incentives, low-cost financing, and R&D financing. As a result, the scale of wind energy was greatly expanded making Denmark the world's largest industrial center for wind energy technology development and manufacture. In recent years the purchasing system has changed and at the present time the selling price of electricity produced by wind-driven generators is tied to the market price plus a surcharge for generation of so-called "green electricity," i.e., electricity produced with ecologically clean technologies.

The German law, obligating energy utilities between 1990 and 2001 to purchase electricity produced using RES contained a clause making it mandatory for the household consumer price for electricity produced using wind energy, solar energy, water resources, and biomass to be set at 90% of the retail price (Table 4.1). Subsequently, the law was revised and amended according to a new more complicated, but still very attractive, price formation formula (the new law went into effect 1 April 2000).

Despite the fact that electricity utilities made more than a few attempts to protest the law, which underwent judicial review several times during this period, the law is what in fact made the country's wind and solar energy market the largest in the world. The market was able to become the world's largest mainly thanks to the creation of its major manufacturing base for wind-driven generators and solar devices.

Installed capacity of wind-driven generators is undergoing rapid growth in Spain today (Table 4.2), largely thanks to the introduction in 1994 of a special incentive price for electricity produced using wind energy. The price has been a major factor in the creation of an industrial base for manufacturing wind energy equipment making it possible for Spain to meet domestic market demands for such equipment while becoming a major wind energy

Table 4.1
**Germany: Purchasing rates for electricity produced using renewable energy sources**

| Renewable Energy Sources | Data based on years (Euro cent/kWh)[a] | | | |
|---|---|---|---|---|
| | 1991 | 1994 | 1997 | March 2000 |
| Wind/solar[b] | 8.49 | 8.66 | 8.77 | 8.3 |
| Biomass (<5 MW)<br>Hydropower, sewer and landfill gases (< 500 kW) | 7.08 | 7.21 | 7.80 | 7.32 |
| Hydropower, sewer and landfill gases (500–5000 kW) | 6.13 | 6.25 | 6.33 | 5.95 |
| *As set by the Law on Renewable Energy of 2000* | | | | |

| Renewable Energy Sources | Capacity (MW), Euro cent/kWha | | | | Annual decrease (%)[c] |
|---|---|---|---|---|---|
| | 0-0.5 | 0.5-5 | 5-20 | >20 | |
| Wind[d] | 6.2-9.1 | 6.2-9.1 | 6.2-9.1 | 6.2-9.1 | 1.5 |
| Biomass | 10.2 | 9.2 | 8.7 | - | 1.0 |
| Photovoltaic electricity[e] | 50.6 | 50.6 | - | - | 5.0 |
| Geothermal energy | 8.9 | 8.9 | 8.9 | - | none |
| Hydropower | 7.7 | 6.6 | - | - | none |
| Landfill gases | 7.7 | 6.6 | - | - | none |
| Mine gases | 7.7 | 6.6 | 6.6 | 6.6 | none |
| Sewer gases | 7.7 | 6.6 | - | - | none |

a. An exchange rate of 1.96 Deutsche Marks to the Euro was used before the Euro was adopted.
b. Beginning in 1998, the selling price of electricity produced using solar energy was 50.6 Euro cents/kWh.
c. Annual decrease (as a percentage) in selling price, beginning with 2002.
d. For wind energy, purchase rates are determined locally.
e. PV systems, installed after the year when 350 MW capacity was reached, are no longer valid in terms of purchase rates.

*Source: IWR (1999); Schleich, et al. (2001) and Schaeffer (2001)*

equipment exporter.

And so Gamesa Eolica sells most of its turbines to China. Spanish manufacturers already have trade representatives in the U.S., Portugal, France, Italy, India, Australia, Japan, Cuba and China.

This very impressive development of wind energy in Spain and the world are due to two contributing factors – surcharges for electricity produced using RES and investments made by major companies.

To draw a parallel from history, one need only recall that Spain is the homeland of the great Cervantes and recall how his hero Don Quixote de la Mancha "tilted" at windmills. Today the image of tilting at windmills has taken on a totally different meaning, namely, tilting at the advent of wind energy is meaningless in the 21st century.

In order for a policy designed to support energy produced using renewable energy sources to be successfully implemented, it is important that the policy consistently provide guarantees to wind energy investors. Granting long-term 15 to 20 year contracts, providing guaranteed buyers, and setting a guaranteed price that provides investors with an acceptable level of profitability reduce renewable energy investment risks. To encourage the development of several types of renewable energy technologies it is important that a specialized payment exist geared to the particular type of renewable energy technology used to produce electricity. That will create conditions more favorable to acquiring the capacity to produce electricity using renewable energy and a mix of technologies on a large scale than would a universal level of payment for producing electricity using renewable energy sources. A strategy intended to encourage utilities to use renewable energy sources must, insofar as possible, be simple and incur low administrative costs. At the same time, the strategy should be flexible enough to make it possible to gain market access and foster cost effectiveness because gradual progress in those directions is what leads to a gradual lowering of prices.

*The success of policies designed to support utilities using renewable energy sources depends crucially on, among other things, integrating those policies into the long-term planning process and other policy and strategy decisions so that, for example, tax incentive schemes can create a stable environment conducive to further development of the renewable energy technologies industry* [24].

Table 4.2
**Wind energy in Spain**

| | |
|---|---|
| Total capacity as of the end of 2005, MW | 9,500 |
| Total capacity planned for 2011, MW | 20,000 |
| Growth level during 2003-2004, % | 33 |
| Share of the national energy supply, % | 6.5 |
| Equivalent number of household consumers supplied, million | over 4 |
| Number of companies working in the wind energy sector in 2004 | up to 400 |
| Total number of jobs in the wind energy sector in 2004 | 30,000 |
| Number of jobs planned for 2011 | 60,000 |

*Source: Cynthia Graber. Wind energy in Spain*

## *Tendering policies*

Tendering is a competitive process, under government oversight, designed to meet planning targets through long-term energy purchasing agreements concluded with renewable energy producers. Tendering provides an alternative to special purchase rates for electricity produced using renewable energy sources. What is distinctive about tendering is that the price for an renewable energy product or an renewable energy project proposal is selected on the basis of a competition (competitive bidding) whereby the offer that is technically and financially the best is chosen. Just as there are laws obligating energy utilities to purchase electricity produced using renewable energy sources, tendering provides guarantees that a product produced at a specific renewable energy plant and that it will be purchased at a special price and for a specified period of time.

The difference between these two policy tools is how the price is determined and which renewable energy producers can participate in the energy production process. In accordance with laws obligating utilities to purchase electricity produced using renewable energy sources, any authorized renewable energy producer can supply the electricity so long as it is sold at the price determined and purchase guarantees are provided. Whereas with tendering, prices are offered on a competitive basis and those projects that offer the best price are selected.

Once projects have been chosen, contracts are awarded to those projects for the purchase of the amount of electricity they are to produce. As part of the process of making a tender, renewable energy producers present their proposals for construction of the generating capacity for producing the renewable energy and propose a price that would be acceptable to them for producing the electricity.

The renewable energy projects which can offer the most competitive prices are selected in exactly the same way. Purchase guarantees for the entire amount of electricity they are to produce are granted to the projects selected.

As with laws obligating energy utilities to purchase electricity produced using renewable energy sources, a guaranteed electricity purchase contract helps lower investor risk while securing project financing. Similar to the approach used in laws for guaranteed purchases of electricity produced using renewable energy, the amount of electricity that electricity utilities obtain can depend on competitive price offers (i.e., the lower the prices offered during the tendering process the more electricity can be purchased). This same strategy can be combined with electricity purchase guarantees whereby the electricity is sold at acceptable prices determined by competitive bids.

The greatest advantage of awarding contracts through tenders is that over time it lowers renewable energy production costs. The British experience (Box 4.2) with tendering brought prices down over a five-year period from USD 0.18/kWh to USD 0.045/kWh. To achieve such success in lowering prices it is very important to integrate tendering as a strategic policy tool with resource planning decisions and with across-the-board management methods.

Nevertheless, tendering does have certain inherent drawbacks of its own. In the first place, keen price competition works to the advantage of large renewable energy producers and utilities because their scale of operation and all their experience make it easier for them to cut expenditures which means they can offer lower prices in the competitive bidding process. In Denmark, Spain and Germany and other countries where contracts are put out for tender, tendering has not stimulated the development of new infrastructure for local manufacturers of renewable energy equipment and technologies the way that laws obligating energy utilities to purchase electricity produced using renewable energy sources have.

Box 4.2

***Tendering policies were successful in Great Britain*** in the 1990s during which time five rulings were adopted to foster the development of a competitive environment in renewable energy. The purpose of the rulings was to bring 1,500 MW of new renewable energy capacity on-line, equal to approximately 3% of Great Britain's total energy supply. The Government obligated 12 regional electric companies, which were adapted accordingly, to purchase all the electricity produced by projects that had been selected on a competitive basis. After the first package of rulings went into effect, the policy underwent a number of modifications regarding competitive awarding of contracts entailing certain technical obligations. On the basis of the modified policy, wind energy projects became competitive within the renewable energy sector, enabling wind energy projects to be competitive, for example, with projects using biomass energy. Contracts were awarded to those projects whose per unit of energy production costs were the lowest. A specialized approach, used as part of a strategy for various technological requirements, made it possible to implement a number of measures designed to diversify energy resources.

## *Secondary incentives*

As indicated above, secondary incentives are used in combination with strategic policy tools to facilitate the entry of Independent Power Producers into the renewable energy market. Generally, the two strategic policy tools discussed above are more effective when used in combination with secondary

incentives, since the strategic policy tools, by themselves, are not powerful enough to stimulate investments in renewable energy.

### Investment incentives

Investment incentives are designed to lower renewable energy sources development capital investments and to reduce investor risk. Incentives can take the form of capital grants agreements or third party financing, provided the government assumes the risk or grants interest bearing loans. Financial support should be phased in over time as an inducement to manufacturers of renewable energy equipment and technologies and to Independent Power Producers to improve renewable energy technologies and cut costs.

### Tax measures

Investment tax credits as well as property tax exemptions, import duties exemptions, and VAT exemptions can serve as incentives to build renewable energy plants as part of various projects. Renewable energy producers can be granted tax breaks on profit taxes (tax exemption during start-up). Accelerated depreciation is another tax measure that acts as an incentive for investment in renewable energy production capacity by easing the tax burden on companies investing in renewable energy. Accelerated depreciation should be phased in gradually over a three to five year period [24].

## 4.2. Utilities and government institutions

Mandatory standards, so-called Renewable Energy Portfolio Standards (REPS), are a major policy tool useful in providing incentives for utilities and government institutions to develop renewable energy. By involving major energy utilities in renewable energy (such as state stock company Uzbekenergo in Uzbekistan), Renewable Energy Portfolio Standards are an effective renewable energy investment incentive [24].

### *Renewable energy portfolio standards*

The Renewable Energy Portfolio Standards, like laws obligating energy utilities to purchase electricity produced using renewable energy sources, function as a strategic policy tool for creating a renewable energy market. However, unlike a law obligating energy utilities to purchase electricity produced using renewable energy sources, Renewable Energy Portfolio Standards are a quantitative-based tool for establishing the target quantity of renewable energy that utilities are to put into the overall energy balance for a specific period of time. Renewable Energy Portfolio Standards also specify who is responsible for purchasing the renewable energy and determine the penalties for non-compliance. The direction in which Renewable Energy Portfolio Standards application is developing has hardly any impact on price formation and lets the market determine the price level.

In accordance with Renewable Energy Portfolio Standards, all energy utilities and retail suppliers are required by the government to make mandatory purchases of a specified amount of renewable energy. Renewable Energy Portfolio Standards can be used in conjunction with other tools, for example, government funding. Renewable Energy Portfolio Standards are gaining in popularity as a form of support for renewable energy development. A number of developing countries are presently considering the possibility of moving in the direction of Renewable Energy Portfolio Standards and introducing a competitive market system in the electricity sector by gradually introducing their own special electricity purchase rates for electricity produced using renewable energy sources.

There are several constructive factors that can help make the use of Renewable Energy Portfolio Standards successful in accelerating the development of new renewable energy technologies. The main features of Renewable Energy Portfolio Standards in this respect are that Renewable Energy Portfolio Standards provide a long-term perspective for achieving targeted renewable energy levels and renewable energy technologies and for increasing those targets with the passage of time. Renewable Energy Portfolio Standards also provide for strict and effective enforcement of established requirements for exacting penalties for non-compliance and they set generating capacity targets. An impor-

tant condition is that there be creditworthy buyers to conclude long-term contracts with and to secure renewable energy financing. Creation of a certification-based trade platform designed to provide certified renewable energy generating sources helps all parties meet their target obligations while reducing associated administrative costs [24].

Levying obligations is a tool often applied to transmission or distributor companies and enterprises. It can be a highly beneficial practice when applied to a power transmission company. It makes it possible for additional costs associated with adopting renewable energy technologies to be distributed over all categories of consumers which in turn reduces the financial burden on the public. For renewable energy, the add-on cost per unit of energy for transmission companies is often negligible even in countries with low electricity prices. For example, Denmark was successful in including renewable energy in its energy balance and distributed the costs among all types of consumers in the form of government services obligations, thereby shifting part of the electricity sector's environmental improvements expenditures burden onto the consumer.

In this connection, areas with limited renewable energy resources must pay more for energy than regions with plentiful renewable energy resources. But that makes it much easier for the sector to function and to monitor the sector's activities because only one electricity transmission company's obligations have to be monitored instead of those of a large number of electricity distribution enterprises.

The use of voluntary agreements between the government and utilities and industrial enterprises can serve as yet another way of implementing Renewable Energy Portfolio Standards. Voluntary agreements have the advantage of being easier to implement because they do not require a mandatory legislative base thus speeding up the implementation process and bringing stakeholders into the process of formulating relevant strategies. This lets utilities and industrial enterprises exert their influence on the process and to review and approve incentives which will eventually apply to them. Voluntary programs have been successful in Denmark and USA (Texas). An important point about their experience is that the government lent its support to voluntary compliance with obligations assumed but it retained the right to enact a mandatory legislative base, if compliance were not achieved voluntarily.

At the end of the 1980s an agreement was concluded in Denmark between the government and national energy utilities for the purpose of greatly expanding the use of wind energy and introducing cogeneration plants on a large scale in the country's energy system. Furthermore, by involving major market players in the purchase and construction of a large number of wind-driven generators, Danish manufacturers of wind energy equipment had to meet rigorous quality standards for their output (i.e., generators, blades, etc.).

Distributing obligations is often attractive, strategically speaking, because it does away with the need for subsidies since any extra costs are spread out among all categories of consumers [24].

## 4.3. Private investors

The mechanism discussed below can be used as an incentive for private households and the commercial sector, which is strongly regulated by the government, to use solar water heater systems, and to provide favorable conditions for manufacturers to use solar water heating technologies. This can be done through the use of an inverted rate system which can be made stronger through the use of secondary incentives, such as investment incentives and tax measures.

### *Inverted electricity tariffs*

Electricity consumption generally goes up as personal income goes up (Box 4.3). To lessen the degree of this dependency, an inverted tariff system can be introduced which gradually adjusts the price of electricity in such a way that the per unit price of electricity increases with the growth of electricity consumption. The theory underlying this approach is based on the assumption that the price for energy consumed should reflect generation costs in such a way that a consumer consuming a greater part of the energy would pay a greater part of the costs for the energy consumed. Payment for capacity should

likewise include definite incentives so that consumers reduce their system capacity demands to lower their electricity bills. Determining the threshold at which the per unit price of energy begins to rise is the key to inverted rates. The threshold should be geared to the ability of low income consumers to pay their electricity bills. Generally, the lowest inverted rate level is set lower than the regular price which it replaces and then, as energy consumption increases, it rises gradually.

Inverted tariffs protect underprivileged groups from rising energy prices while making higher income groups pay an additional charge for each additional kWh of electricity consumed in excess of a certain level. An inverted tariff can be set that will encourage the use of solar water heaters without limiting underprivileged groups' access to electricity. Nevertheless, this approach is usually used in conjunction with investment incentives and tax measures. Mandatory provisions in administrative rules and regulations can be used as an incentive for construction companies building new buildings in residential areas to install solar water heaters in them for hot water. As the math shows, the cost added to total construction costs for a new building with traditional centralized heating by putting in solar water heating systems is minimal [24].

Box 4.3

Inverted block rates have been in use in California since 2001. The State Energy Utility Companies Commission of California introduced a five-stage inverted block rate. Blocks consist of a so-called "base" rate (determined by consumers' electricity needs) to which successively larger percentages of the block rate are added as time goes by (first from 101 to 130%, then from 131 to 200%, then from 201 to 300%, and finally, over 300%). The per unit price of energy offered by the Southern California Edison Company varies from 13.009 cents per kWh (the minimum block rate) to 25.993 cents per kWh (the maximum block rate) (SCE, 2004).

Barlington, Vermont's Electricity Department applies a two-block rate tariff for household consumers. For the first block (200 kWh) they pay 5.945 cents per kWh but for electricity consumed in excess of the first block and falling into the second block, they pay 10.1427 cents per kWh during the summer and 10.5309 cents per kWh during the winter (BED, 2003).

## *Investments by small rural cooperatives*

Investments by rural cooperatives work well for small renewable energy projects, such as portable solar photovoltaic systems, solar water heating systems and other renewable energy technologies in areas that have no energy infrastructure. For such projects to be successful it is best to provide local participants access to sources of micro-financing or to other forms of soft loans obtainable from international financial organizations, government financial channels or public-private cooperation programs. This is due to the fact that the poor living in rural areas or people without a steady income are seldom able to obtain full financing to invest in renewable energy technology.

Research has been done showing that an renewable energy fund is the best tool for providing rural areas with electricity. A renewable energy fund makes available a reliable source of financing for the subsidy and micro-financing needs of rural consumers. A renewable energy fund can be created either by setting an additional tax on current electricity or on fossil fuel prices or by allocation of government funding. Ordinarily, additional expenditures constitute a very small part of unit costs for electricity. Because that is the case, it is possible to carry out rural renewable energy technology development programs on a larger scale and with greater success since local participants can either fully or partially finance renewable energy technology use. By the same token, an renewable energy fund makes it possible to make renewable energy technologies accessible to rural communities, even after donor assistance has come to an end because local enterprises can take over the technologies and adapt them to local conditions.

The renewable energy funds can be successful as a project financing tool in rural areas where people's incomes are relatively low. A renewable energy fund is a fund in which profits are used to finance loans to cooperatives which pay them back in partial installments. Later on these same moneys can loaned to other rural communities which in turn will repay them in the same small installments. This rolling over gradually increases the amount of capital available for micro-financing purposes [24].

## 4.4. Financing mechanisms applicable to developing countries

### *Micro-credit schemes*

A micro-financing system is one that provides access to monetary resources and other financial services to groups who can not obtain them from traditional financial institutions. It is no secret that commercial banks are extremely reluctant to grant micro-credits to start-up enterprises and demand correspondingly high collateral to secure a micro-loan. They prefer to work with well established companies that need rather large sums of money to expand their operations. The main demand banks make of borrowers is that they provide maximum guarantees that a loan will be repaid on time at a specified interest rate. Those living in rural areas often have difficulty obtaining loans because of the lack of banks where they live, lack of sufficient collateral to secure a loan, lack of regular sources of steady income, the impossibility of finding co-signers, and red tape involved in filing a loan application. Commercial banks are reluctant to give loans to rural entrepreneurs because the loans entail high operating costs associated with: processing small loans, the remoteness of rural settlements, the high risks associated with agricultural production and the poorly developed insurance system.

Inasmuch as the traditional banking system is unprepared to grant credit to underprivileged citizens wishing to go into business or who are already running a small business, micro-financing provides them better access to monetary resources.

*Micro-financing*, as practiced around the world, consists of a whole range of services, among them:

*Micro-crediting* – a small sum of money is issued as a loan to a client by a bank or other institution. Micro-credits can be granted to individual or to groups;

*Micro-saving* – depositing a small amount of money for someone's future use. Savings accounts allow families to accumulate money for unforeseen expenses and for investing; and

*Micro-leasing* – leasing services allowing small enterprises and small entrepreneurs to lease inexpensive equipment, agricultural machinery and automotive vehicles for which they do not have the money to pay for in full.

The first micro-crediting system, developed in Bangladesh in the 1970s, has since spread to many countries throughout the developing world. It granted micro-credits to the underprivileged who could not put up guarantees or collateral of any kind. The system lent very small sums of money to the impoverished strata of society, to people unable to obtain loans from regular banks. It 'sparked' a sense of initiative and entrepreneurship in borrowers enabling them to break out of poverty.

### *The use of concessions*

Many countries use a concessions approach. It creates a market whose critical mass is sufficient to grant commercial firms exclusive rights within a large geographical area so that large private companies are willing to make their sources of financing available to them and thereby support their sustainable development. The concept also has great potential for lowering equipment manufacture costs through wholesale discounts.

The problem with the concessions approach is that it creates a monopoly. If owners of concessions interrupt their operations, that can impede adoption of renewable energy technologies.

### *Creation of renewable energy funds*

The renewable energy funds can be created by levying fees on fossil fuels of all kinds and then pooling the fees and using them to support renewable energy projects. The Republic of South Africa is pursuing such a policy with its Central Energy Fund which receives a small amount of money from fees

levied on gasoline. The Fund, which has been a success, is no longer used exclusively for renewable energy investments. It is now used to make investments in all types of energy, in energy prospecting and in energy saving projects. The Central Energy Fund is administered by the Government.

A renewable energy fund can also be established through a government grant of a one-time payment of a certain sum of money which is then divided up among renewable energy projects on the basis of project applications. In reality this kind of fund amounts to a subsidy but can be of use in fostering the creation and adoption of off-grid (stand-alone) technologies whose rapid acquisition would be impossible if other financing channels were to be used.