In Search of Better Ways to Develop Solar Markets: The Case of Comoros

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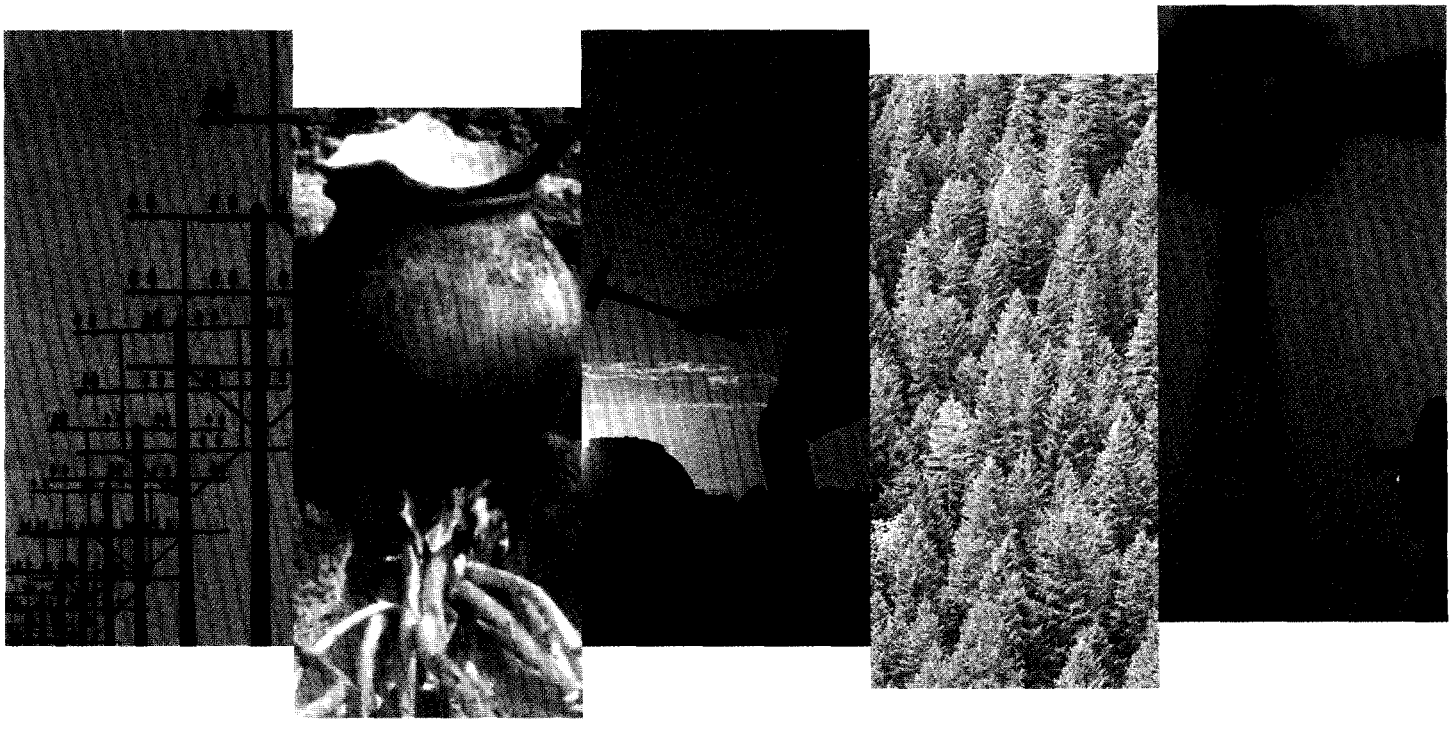

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JOINT UNDP / WORLD BANK

ENERGY SECTOR MANAGEMENT ASSISTANCE PROGRAMME (ESMAP)

PURPOSE

The Joint UNDP/World Bank Energy Sector Management Assistance Programme (ESMAP) is a special global technical assistance program run as part of the World Bank's Energy, Mining and Telecommunications Department. ESMAP provides advice to governments on sustainable energy development. Established with the support of UNDP and bilateral official donors in 1983, it focuses on the role of energy in the development process with the objective of contributing to poverty alleviation, improving living conditions and preserving the environment in developing countries and transition economies. ESMAP centers its interventions on three priority areas: sector reform and restructuring; access to modern energy for the poorest; and promotion of sustainable energy practices.

GOVERNANCE AND OPERATIONS

ESMAP is governed by a Consultative Group (ESMAP CG) composed of representatives of the UNDP and World Bank, other donors, and development experts from regions benefiting from ESMAP's assistance. The ESMAP CG is chaired by a World Bank Vice President, and advised by a Technical Advisory Group (TAG) of four independent energy experts that reviews the Programme's strategic agenda, its work plan, and its achievements. ESMAP relies on a cadre of engineers, energy planners, and economists from the World Bank to conduct its activities under the guidance of the Manager of ESMAP, responsible for administering the Programme.

FUNDING

ESMAP is a cooperative effort supported over the years by the World Bank, the UNDP and other United Nations agencies, the European Union, the Organization of American States (OAS), the Latin American Energy Organization (OLADE), and public and private donors from countries including Australia, Belgium, Canada, Denmark, Germany, Finland, France, Iceland, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Sweden, Switzerland, the United Kingdom, and the United States of America.

FURTHER INFORMATION

An up-to-date listing of completed ESMAP projects is appended to this report. For further information, a copy of the ESMAP Annual Report, or copies of project reports, contact:

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(ESMAP)

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Contents

Acronyms and Abbreviations

CEE	Comores Eau et Electricité
EDF	Electricité de France
ESMAP	Energy Sector Management Assistance Programme
IDA	International Development Association
PV	photovoltaic
SHS	solar home system

Currency Equivalents

The Comoran franc (CF) is tied to the French franc (FF) at

1 FF = 75 CF

Units of Measure

kW	kilowatt
kWh	kilowatt-hour

In Search of Better Ways to Develop Solar Markets: The Case of Comoros

Introduction

This document reports the results of a US$150,000 ESMAP project in Comoros that was carried out between summer 1997 and September 1999 and funded by the French Ministry of Cooperation. It also is a discussion paper exploring alternative ways to promote solar electricity. The project was meant to develop the market for solar electricity and to help non-electrified households attain higher comfort levels without waiting for the electricity company to expand its distribution network. The project supports the general poverty alleviation and environmental objectives of the World Bank and ESMAP. The outcome of the project was interesting: it showed that large projects are not necessary to begin developing the market for solar equipment.

General Review of Solar Activities

Many countries are currently developing solar markets. Their efforts are largely financed by supply-driven donor funds rather than being driven by demand through "pure market development." Donors decide normally, but not always after client consultation, what should be done to trigger the market in a particular country. This usually translates into fairly large projects (several million US$) with fixed targets such as "selling x photovoltaic systems in y years." Further project objectives may include safeguarding the sustainability, mainly as a result of the expected volume of equipment sales at the end of the project. Technology choices are often pre-determined, i.e., complete solar kits consisting of a (large) panel, a charge controller, a (solar) battery, wiring, switches, and a few fluorescent lights. Many donors prefer or insist that equipment be purchased in their own countries, which does not necessarily provide the lowest cost alternative to the beneficiary.

Because technological choices are fixed and often reflect perceived minimum benefit levels acceptable in the donor country, potential beneficiaries sometimes find it difficult to adopt the equipment. It may not correspond to his/her own needs, even though (s)he is asked to pay for it. In fact, (s)he may already have parts of a system, does not need a complete kit, or would have liked to have a kit with different specifications (e.g., much smaller and cheaper). The common solution is to build in financing mechanisms in one way or another so that beneficiaries can spread their payments over time and enjoy larger systems than they could have afforded if paying cash. However, financing mechanisms for luxury (or non-productive) items in rural areas usually do not exist in most developing countries, and will therefore have to be created.

Thus, this approach tries to simultaneously develop an infrastructure for the sales and after-sales service of solar equipment as well as for financing mechanisms. Each of these requires a

systematic and substantial effort, and putting them in place simultaneously is not an easy task. Adding to the difficulty is the fact that, frequently, several companies are created specifically to service the project—i.e., joint ventures between local companies and companies in donor countries that divert part of their business to earn a share of the donor money available. Although some of these local companies may already have been involved in solar technologies before, they usually revert to their main business (i.e., their business before the project began) as soon as the donor money dries up. These companies cannot be blamed for this behavior: it is rational and logical. It is much easier to service a donor project than it is to deal with numerous individual clients, who often live in remote areas. Whether project targets are reached or not, few projects have reached sustainability in terms of service provision and market development.

Pure Market Development

Kenya and Zimbabwe are examples where sustainable and substantial markets have developed, mainly supplied by the private sector through commercial sales and competition. Private individual investments rather than donor funds triggered these markets' development. Of course, donor-financed installations or projects exist in both countries (churches, hospitals, missions, schools, etc.), and this helped to demonstrate the viability of the equipment to the public at large. What actually prompted the market development in these two countries is not exactly known, but possible reasons are

- an existing active market for car batteries to power rural television sets together with TV reception throughout most rural areas;
- poor performance of, or no access to, the utility in rural and peri-urban areas (even in urban areas in Kenya), with little chance of obtaining a connection soon;
- a thriving private sector with very little government control; and
- the existence of a cash economy in rural areas.

How can such market development be triggered elsewhere, without the costs normally associated with large, donor-financed projects? One of the main differences to the donor approach is that solar companies sell what clients demand. In Kenya, clients were willing to pay only for very small photovoltaic (PV) modules (10–12 watts, built using an amorphous silicon technology perceived as inferior by many international solar companies, solar experts, and donor agencies), and for second-hand and new car batteries (also considered unsuitable for solar systems by the same companies and experts). People specifically do not opt for complete kits, with charge controllers, larger modules, and solar batteries included, but buy parts of such systems only. In addition, very few people buy the compact fluorescent lamps that usually come with the kits promoted, preferring instead to use small incandescent and regular fluorescent (tube) lamps. People continuously upgrade their equipment, starting with a stand-alone battery, in installments that usually do not exceed US$100 (the battery is normally the most expensive part of the solar system). With this upgrading approach, users make use of the modularity of PV systems.

In Kenya, a few innovative firms started servicing the unmet demand for such low-cost equipment, not from the capital, but from provincial towns. After some time they were copied by the larger and more conservative firms, and as a result an extensive distribution network now

exists throughout the country. Some informal credit systems exist now and hire-purchase systems are developing, but one still cannot obtain a loan from a local bank to finance a PV system.

Nowadays in Kenya one finds one or more outlets for modules and other components in every town of importance; electrical stores, car battery outlets, and haberdasheries have begun to sell equipment, and they often offer installation and/or repair services as well. This infrastructure was not built overnight, as many suppliers were initially reluctant to start servicing individual clients, particularly outside the capital. Now, the market is well established, and it is driven by demand rather than supply. Competition is stiff and prices have fallen considerably, and it is unthinkable that solar equipment will no be longer sold. Moreover, the market is sustainable, and has been growing ever since the early to mid-1980s at rates of up to 25 percent per year; estimated sales in 1999 amounted to over 0.5 MW, of which more than 60 percent was in the form of small amorphous modules. Accumulated capacity is now conservatively estimated at more than 3 MW, with some 150,000 households served.

In Zimbabwe a large donor project was launched in parallel to a fairly strong private market. The project concentrated on large kits (exempt from import duty and taxes) with subsidized loans, while the private sector sold mainly parts and small systems (at prices including taxes and duties). Surveys show that some 60,000 households own a solar installation, 60 percent or more of which are in the form of a small system installed over several years, as in Kenya.

It appears that Kenyan users were right after all: the small, amorphous systems (without controllers, and with ordinary car batteries) seem to perform well. During a recent survey, several hundred households using amorphous modules were interviewed.[1] It was found that the majority of these systems are still functioning within the technical specifications (the oldest found system was over 8 years old[2]). The average life of batteries was found to be between 1.5 and 2 years; 25 percent of households reported that they bought their battery between 2 and 5 years ago.

Few countries, if any, follow the same strategy. In some countries, large, donor-supported programs seem to have resulted in a comparable total capacity installed, and to a certain extent a sustainable market. In Morocco, for example, there was (until a large subsidized program was recently announced) a very active and large donor market, but individual end-user demand is strong as well. In Mexico, a large (multi-million US$) government-subsidized program catalyzed some private market development. In China there are also many activities in the public and the private sector, and about 11 MW has been installed since the early 1980s. About 40 percent are used in telecommunications, 30 percent in remote applications (mainly households), 20 percent in industries, and 10 percent in other applications.

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1 Richard D. Duke, Shannon Graham, Mark Hankins, Arne Jacobson, Daniel M. Kammen, Bernard Osawa, Simone Pulver, and Erica Walther, "Field Performance Evaluation of Amorphous Silicon (a-Si) Photovoltaic Systems in Kenya," to be published in 2000 by ESMAP, Washington, D.C.

2 It is generally acknowledged that amorphous modules are inferior to (and cheaper than) crystalline modules. Whereas some companies guarantee the power output of crystalline modules for 20 years, the power output of amorphous modules, which decreases somewhat over time, is guaranteed usually for 5–10 years. The amorphous modules' useful life is estimated to be 10 years.

There are quite a few examples of countries where subsidized programs have installed hundreds if not thousands of solar home systems (SHSs). The impact of subsidies on fragile markets is often underestimated. Many of these programs failed to make a lasting impact. In fact, it is quite easy to sell subsidized SHSs, but to create a sustainable market is much more difficult: the infrastructure for operation and maintenance needs to be developed, which is no trivial task.

If only one lesson is learned from the experience in Kenya or Zimbabwe, it is certainly that end-users (who should be considered *clients*—i.e., normal actors in a functioning market—rather than simply beneficiaries) appreciate choice. Despite suppliers' bias towards large, high-quality equipment and complete kits, households decided that instead they wanted small, low-cost components from which to assemble, over time, their electricity supply systems.

Different Approach: Innovative Use of Concessions to Promote Market Development

In Latin America, utilities or governments use concessions to provide electricity service in rural areas. Although large numbers of rural households are already connected to electricity grids (Argentina, Brazil, Chile, and Mexico), additional households located far from the grid with low estimated consumption patterns will be electrified through solar equipment. These concessions are large contracts awarded to firms for the installation of thousands of solar systems on behalf of the utility. The setup is quite different from what is applicable in Comoros, although in both cases (foreign) firms are interested in becoming active in providing electrification services.

In search of alternative approaches, ESMAP launched a pilot project in an attempt to trigger private market development by a different use of a concession. This was done in Comoros, where ESMAP and the government provided several time-bound benefits to a private company for it to start commercializing solar electric equipment. In order to do this, the company needed to build an infrastructure for the installation, repair, and maintenance of solar equipment at its own risk. It was allowed to reap the commercial fruits, if any, of such business development effort. This small (US$150,000) project, financed by the French Ministry of Foreign Affairs and executed by the World Bank through ESMAP, saw some early and promising results. Even before the results of this pilot project were fully known, the methodology was already applied in a World Bank/GEF-financed electrification loan for Cape Verde. In addition, ESMAP is currently testing a modified setup to develop the market for solar electricity in Swaziland. Lessons from Kenya and Zimbabwe were incorporated in Comoros project to the extent possible by giving maximum responsibility for market development to the private sector and by insisting on as much choice as possible from the onset.

The ESMAP Project in Comoros

In July 1995, staff of the Comoros ministry dealing with energy,[3] in conjunction with ESMAP consultants, carried out a market and demand survey for rural electricity services. This entailed

[3] The actual name of this ministry has changed several times in recent years. The most recent name for the section dealing with the project was la Direction Générale de l'Energie et des Ressources Minérales (DGERM) du Commissariat d'Etat à l'Equipement et à l'Energie (CEEE).

surveys of the target population and group discussions with rural households and village elders. On the basis of these data, it was estimated that the market for solar electric equipment will be more than 0.8 MW over the next 10 years. Tender documents were developed to invite, through international competitive bidding, a firm willing to kick-off the commercial development of this market. For doing so, the selected firm would receive several temporary benefits (see further) from the government and from the project—at little or no cost to the project. The economic costs of these benefits were limited, or within categories that would be extended to any foreign firm installing itself in Comoros. The project also included a provision for the Ministry staff to supervise and liaise with the private firm, and to launch an awareness campaign, and for ESMAP staff to supervise the project.

Before the activity was launched, not a single firm was selling solar equipment in Comoros. The only users were the military and the police, and only in locations where grid access was not possible. The immediate objective of the project was to attract a private firm to start commercializing solar equipment in the country. To do so, the project made a revolving fund of US$100,000 available for the exclusive use of the firm for a two-year period. This fund was managed by the government (the ministry dealing with energy), which placed an order for demonstration equipment from the selected firm for the full amount. The equipment was selected for its demonstration potential in different market segments, as identified in the market survey. In this case the markets were mainly lighting and audio services for mosques, a range of individual household needs (from small lighting systems to "deluxe systems" that also include a refrigerator), and streetlighting. PV-powered audiovisual promotional equipment was included as well. The firm was to install the equipment; any amounts recovered were to be reinvested in more equipment through follow-up orders (to be made by the government). In this way, the firm had strong incentives to place the equipment with clients who paid for it quickly; the faster the turnover, the more often the revolving fund would be used. Similarly, the harder it worked on creating an infrastructure for developing the market, the higher the financial returns would be.

The government granted the firm a three-year grace period for taxes and duties: it could freely import equipment, and it had the right to export earnings free of taxes. The government also pledged that it would grant the firm contracts for all public projects dealing with solar energy during the two-year period when/if these happened to materialize. Finally, to support the activity the government launched an awareness campaign to promote, in general, the use of solar energy in areas not served by the national electricity grid.

The selected firm, Solélec, a subsidiary of what was then Total Energie based in la Réunion, was strongly encouraged to use its own capital to invest in the market development—i.e., to satisfy the demand for PV systems alongside orders made by the government for demonstration purposes. This is exactly what happened: the firm created a joint venture (Enercom) with a local electrical service company (ADC), and began marketing its own equipment. In fact, equipment brought into the country by the company within two months already exceeded the initial amount paid by the project through the revolving fund.

Criteria imposed by the project for the use of the revolving fund included providing an extended guarantee on equipment (five years on most parts), creating an after-sales service, and submitting a proposal for a credit mechanism to be operationalized within the two-year project period. With

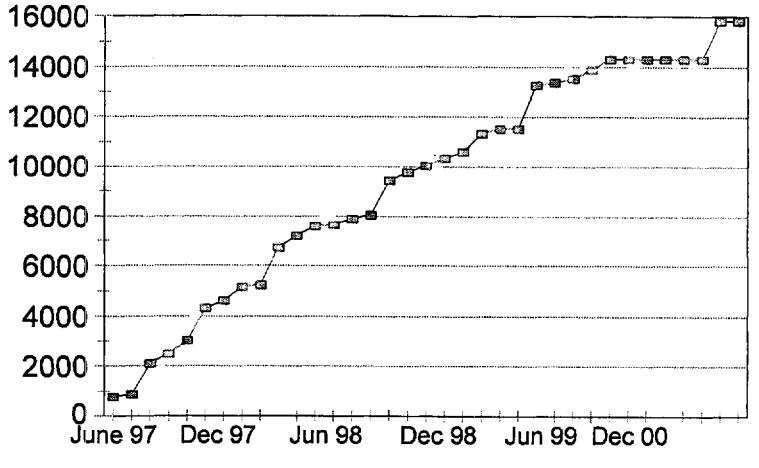
its own money, of course, the firm concentrated on the existing cash market. It is expected that the firm will continue to provide repair and guarantee services as started during project start-up; its objective is no longer to sell as many systems but to develop the market, and this can only be done if there is easy access to these services. With project money, the intention was to put a financing mechanism in place so that the less well-to-do can also benefit from solar technology to satisfy their needs for electricity.

Results

Despite the unstable political environment (ten energy ministers and two coups d'état during the two-year project) and deteriorating economic circumstances (government employees are 22 months behind in salary payments), the ESMAP project was able to convince a foreign firm to install itself and start market development. During an evaluation at the end of the two years, the firm admitted that normally it would never have thought of Comoros as a place to start market development. However, now that the company is in place, it finds that the potential market is attractive enough to continue what it started. It has an office on the main island of Grande Comore from which it plans operations, and it has a representative on the more densely populated but poorer island of Anjouan (on the smallest island of Moheli there is no representative).

Enercom, the joint venture between Solélec and ADC, was able to install about 16 kW of equipment (of which 2 kW were installed as demonstration systems that were not paid for by the end-users) with an estimated value of US$250,000. See Figure 1 for the market development data. About 100 systems were installed in households, mosques, public streetlights, and dispensaries, and for various professional purposes. In the 5 months after the project ended another 1.5 kW was sold.

Figure 1. Installed Wattage



In parallel to the domestic systems, a good market for public streetlights seemed to develop. Enercom usually installed systems on a trial basis after discussions with the community about their willingness to pay for the equipment. If after one month the community decided it would not pay for the equipment, Enercom de-installed it and placed it somewhere else. (It did not often have to do this: most villages decided to pay, and often gave another order). One of the obvious benefits was that that people could easily walk about at night, a feature well appreciated because most lights were installed in central meeting places in the village, where people gathered in the

evening. Women and children profited specially from this. It was also found that children came to read and study under the lights.[4] For mosques[5] the situation was different, as almost all have a sound system and lights powered by a genset. The initial assumption by the project team that full sound and lighting systems should be installed was unfounded. In fact, not a single sound system was sold during the project. The benefits in the case of mosques were fuel savings and noise reduction. Most mosque systems were also installed on a trial basis, and communities accepted that they should pay for the equipment. Because the investments are much larger than for streetlights, many communities would accept only if they could spread payments over a longer period.

The demonstration effect clearly worked. It was observed that more equipment was ordered after the solar systems were in operation for some time; several communities requested more streetlights or more mosque systems to complement what they already had (even small villages often have more than one mosque). Several household systems were also purchased in the vicinity of the streetlights and the mosque systems. The decisions for communal systems were made on a local basis. Whereas in one larger village several community groups paid for three solar streetlights and for five mosque systems, another community group in the same village refused to pay for one additional solar streetlight.

Enercom agreed to repay the provided financing of US$100,000, minus some US$30,000 of legitimate costs that could not be recovered (such as the cost of the end-of-project seminar, the costs of supervision by the government, and the costs of non-recoverable demonstration equipment). The total costs of the project amounted to US$80,000[6]. This works out to about US$5 per watt installed during the project. Given the fact that the market is growing (the seminar resulted in several new commitments) and that the 16 kW represents about 2 percent of the estimated market for 10 years, one can conclude that this has been a fairly low-cost operation.

Problems Encountered

The two main problems were encountered. First, Enercom saw the activity as a specific project to be implemented rather than as a purely commercial activity (it functioned more or less as an NGO). The procedure of a revolving fund managed by the government did not help either. It would have been better if the company had been given an interest-free loan for the duration of the project. (This is what effectively happened after about one year, when it was decided that the government would not place follow-up orders, and that Enercom could use the money for the remaining time as it saw fit.

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4 Since the power company has been privatized, perception about electricity has changed. Before, people knew that if the distribution lines would come not far from their place, they could obtain (often cheaply) a connection. Even if they would not be able to do this, they would still enjoy (free) street lighting. Now the rules have tightened, and people pay the real cost of connecting to the grid; street lighting is no longer free and must be paid for by the community. Many communities decided not to use street lighting because of the high cost of electricity.

5 In this Islamic country, every village, no matter how small, has at least one mosque.

6 The real costs of the project thus have been US$30,000 of non-recoverable cost, plus US$20,000 for the cost of government supervision and coordination and the awareness campaign, and US$30,000 for ESMAP supervision.

Second, it was impossible to use an existing financing mechanism. Enercom therefore developed its own, selling about 75 percent of the systems on credit (with terms ranging from 6 months to 3 years and interest rates of 12–15 percent). Although local banks, and in particular the Development Bank of Comoros (BDC), were very interested in developing such mechanisms,[7] they failed to do so for lack funds.

Other problems that complicated matters were as follows:

- Comoros is far away from normal commercial supply chains. It took Enercom three months to obtain a shipment of equipment from France, which means that it needed to plan well ahead and have deep pockets to finance such shipments.
- The awareness campaign could have been more effective, although this may have been a direct result of its small budget (the total amount allocated for use by ministry staff for managing, supervising, and launching the awareness campaign was US$20,000);
- As indicated previously, the political and economic situation was unstable, and people may have had priorities other than investing to improve the long-term quality of life. The country was not servicing its debt in early 1999 (IDA had suspended all operations, and many bilateral donors followed suit). This had repercussions on many operations in Comoros; for example, an effective microenterprise project had to cease operations.
- The privatization of EEDC, the water and electricity utility, also influenced the project, in positive and negative ways. EEDC (or Comores Eau et Electricité [EEC], as it is now called) is now run by a French company under an affermage type of contract. As a result of the private sector managing CEE, people rapidly realized that the rules of the game have changed (one now has to *pay* his electricity bill or risk being being cut off—a rule that holds for all clients, whether individual, government, or community). Many villages switched off their public lighting systems after they began footing the bill—and requested information on solar street lighting. Only about 10 percent of the Comorians have grid electricity, and people are starting to realize that it may take many years before they will have access. Before they thought that they could always "arrange" a connection if the grid would come close by. The Islamic Development Bank recently announced a grant-funded project to complete the transmission ring around Grande Comoro. This raised expectations among many people that they would soon have electricity: they are likely to be disappointed in the near future when they realize that it may take five or more years to even complete the transmission ring. The grant includes studying the feasibility of the ring and financing equipment. The study is expected to be completed within two years, after which it will take some time to implement the works. During the last 15 years, virtually all investments in the power sector (including new connections) have been done through donor-financed projects (grants). Grid electricity is expensive (for most

[7] Or using an existing mechanism: it has a credit line to finance rehabilitation or construction of mosques, and it had agreed to include in such projects the cost of the sound and lighting system. However, subprojects failed, for two reasons: the groups that submitted subprojects were not deemed creditworthy, and the BDC's own line of credit had dried up.

customers it is about US$0.25 per kWh, and this does not include costs for grid expansion), and reliability suffers from severe capacity constraints.

- Many Comorians live in France or in the United Arab Emirates. It is estimated that one-third of all Comorans live in Marseilles. Most foreign workers visit their homeland once a year (300–600 visitors arrive each day during the summer months), and they usually bring gifts intended to improve the quality of life of their families. Often the gift is a video or TV system, even though the household may not have electricity. Enercom tried to set up an information bank in Marseilles to show that people can provide electricity at the household level rather easily by buying a solar system. Towards the end of the project Enercom actually opened a bank account in Marseilles to allow people pay for their equipment in France and have it delivered at home in Comoros. This connection was not well developed (it well discussed, but no action was taken), and could be more effective if actively pursued.

Discussion

Did ESMAP create a monopoly? Not really, as any foreign firm that starts doing business in the country receives the same grace-period benefits from the government. It might actually have been desirable to have a second firm test the waters for the accelerated market development of solar equipment. However, such a firm could not have used the revolving fund, nor would it have received any public sector orders during these initial two years. The awareness campaign was designed to raise awareness of alternatives to electricity from the national grid, for anyone willing to invest, and did not promote specific companies (the type of equipment and the name of the selected firm were not promoted). In fact, one other outlet started selling PV panels, albeit from an artisanal boutique (without any technical back-up capacity), and two foreign firms flew in to evaluate the market development one year or so after the start of the project. Discussions with those firms confirmed that they were interested in monitoring the market development, although they did not want to become involved at that point in time.

Should CEE have been involved from the beginning, e.g., by organizing the tender? This is largely a hypothetical question, as CEE did not exist when the project was conceived. In addition, the transformation from its predecessor EEDC to CEE was difficult enough that solar electricity did not get any attention. However, given the complementarity of grid electricity and solar electricity, it would have been useful if a comprehensive strategy had been prepared for the combined promotion of grid and solar electricity. Given a clear choice, households and communities would have able to pick the best option for their conditions.

One of the four islands of the Comoros Archipelago, Mayotte (a French Overseas Department) uses quite a lot of PV equipment installed by the French national power company, EDF. This is also the case in La Réunion (also a French Overseas Department). The climate is roughly the same on all these islands, and if the installation of solar equipment is economically justified in Mayotte or la Réunion, it will be even more so in Comoros, where energy costs are so much higher. EDF has to supply electricity in France (including Overseas Departments) at a uniform tariff, for which reason it has often selected solar equipment in locations difficult to reach or places far from the grid.

Actually, Solélec's home base is la Reunion, although it operates in Madagascar, Mayotte, and Maurice. It had never seriously reflected on developing the market in Comoros: it estimated that there would be no solvable market potential and no money available for luxury investments. However, several reasons exist why it should be tried at least:

1. Many households have one or more family members working overseas, injecting a substantial amount of cash into the economy;
2. The electricity company does not perform well and, before the affermage contract started, there were more outages than periods of service;
3. Less than 10 percent of the population has access to electricity;
4. The domestic electricity tariff of USUS$0.25 per kWh does not cover the costs of production and distribution;
5. Very few new clients have been connected during the past 15 years other than through subsidized donor assistance;
6. The foreign company that was awarded the management contract for the power company finds it difficult to operate effectively, and is not given any incentives to expand service into rural areas; and
7. The prevailing climate facilitates the use of solar energy.

Thus, the immediate result of the project is that the solar electricity market is now being developed, which certainly would not have taken place without the project. Whether it will be sustainable depends on the market itself, how quickly potential users react to messages from the publicity and awareness campaigns, and the physical presence of equipment in the market place. Enercom is clearly making an effort to develop the market. Ideally, more firms will start competing for business when the market develops further. Interest from international firms is there: when the government took out newspaper advertisements in South Africa, Kenya, and France, some 25 firms worldwide purchased the bidding documents. These firms are likely to monitor the initial reaction of the market, and will jump in as soon as they see fit.

Although it is somewhat early to conclude about the feasibility of the methodology, it certainly appears promising. The private firm has installed about 16 kW of modules during the first two years of operation, despite politically difficult times associated with the separatist attempts of one of the Comoros islands. It invested at least as much from its own resources as was put in by the project. As a result, it now has a firm foot on the ground, with a well-equipped and educated team of local entrepreneurs working to develop the market for solar electricity.

Moreover, although the evaluation mission concluded that Enercom acted too much like an NGO and too little like a commercial firm, Enercom took the message seriously. It reorganized internally, quickly started collecting money from the demonstration units, and followed up more thoroughly with villages that have equipment installed to develop follow-up orders. In the month after this restructuring it was also able to secure new equipment orders.

Replicability

Although the situation in Comoros is unique, and the real market development activity is just starting to shape up, there are lessons to be learned. If one were to apply a similar procedure elsewhere, the following is recommended:

- The private company should have a minimum knowledge about the size and characteristics of the potential market, plus a profile of the main potential customers.
- The government should extend clear temporary incentives for a private firm, including fiscal benefits and a limited concession. The revolving fund used under the ESMAP project was too complicated; a simple interest-free loan with a fixed repayment schedule would have been more effective. The concession should be flexible and clearly understood and agreed on by the government and the firm: depending on the specific circumstances (mainly size and market characteristics), it can be for a whole country or for parts of a country. For Comoros, one firm is about right for the start-up phase.
- An internationally respected agency should oversee this process, maintain standards, and ensure that the selected firm does not cash in on the temporary monopoly situation. It is clear that in this approach large firms have an advantage over smaller firms, although there is no reason to believe that smaller firms cannot be part of the process by collaborating in the field with the larger ones. After all, the infrastructure needs to be created, and this cannot be done overnight.
- Eventually, a "manual" should be developed for initiating such activities elsewhere in development projects. This is not necessarily restricted to small countries, or to energy projects.

Joint UNDP/World Bank

ENERGY SECTOR MANAGEMENT ASSISTANCE PROGRAMME (ESMAP)

LIST OF REPORTS ON COMPLETED ACTIVITIES

Region/Country	*Activity/Report Title*	*Date*	*Number*
	SUB-SAHARAN AFRICA (AFR)		
Africa Regional	Anglophone Africa Household Energy Workshop (English)	07/88	085/88
	Regional Power Seminar on Reducing Electric Power System Losses in Africa (English)	08/88	087/88
	Institutional Evaluation of EGL (English)	02/89	098/89
	Biomass Mapping Regional Workshops (English)	05/89	--
	Francophone Household Energy Workshop (French)	08/89	--
	Interafrican Electrical Engineering College: Proposals for Short- and Long-Term Development (English)	03/90	112/90
	Biomass Assessment and Mapping (English)	03/90	--
	Symposium on Power Sector Reform and Efficiency Improvement in Sub-Saharan Africa (English)	06/96	182/96
	Commercialization of Marginal Gas Fields (English)	12/97	201/97
	Commercilizing Natural Gas: Lessons from the Seminar in Nairobi for Sub-Saharan Africa and Beyond	01/00	225/00
Angola	Energy Assessment (English and Portuguese)	05/89	4708-ANG
	Power Rehabilitation and Technical Assistance (English)	10/91	142/91
Benin	Energy Assessment (English and French)	06/85	5222-BEN
Botswana	Energy Assessment (English)	09/84	4998-BT
	Pump Electrification Prefeasibility Study (English)	01/86	047/86
	Review of Electricity Service Connection Policy (English)	07/87	071/87
	Tuli Block Farms Electrification Study (English)	07/87	072/87
	Household Energy Issues Study (English)	02/88	--
	Urban Household Energy Strategy Study (English)	05/91	132/91
Burkina Faso	Energy Assessment (English and French)	01/86	5730-BUR
	Technical Assistance Program (English)	03/86	052/86
	Urban Household Energy Strategy Study (English and French)	06/91	134/91
Burundi	Energy Assessment (English)	06/82	3778-BU
	Petroleum Supply Management (English)	01/84	012/84
	Status Report (English and French)	02/84	011/84
	Presentation of Energy Projects for the Fourth Five-Year Plan (1983-1987) (English and French)	05/85	036/85
	Improved Charcoal Cookstove Strategy (English and French)	09/85	042/85
	Peat Utilization Project (English)	11/85	046/85
	Energy Assessment (English and French)	01/92	9215-BU
Cape Verde	Energy Assessment (English and Portuguese)	08/84	5073-CV
	Household Energy Strategy Study (English)	02/90	110/90
Central African Republic	Energy Assessement (French)	08/92	9898-CAR
Chad	Elements of Strategy for Urban Household Energy The Case of N'djamena (French)	12/93	160/94
Comoros	Energy Assessment (English and French)	01/88	7104-COM
	In Search of Better Ways to Develop Solar Markets: The Case of Comoros	05/00	230/00
Congo	Energy Assessment (English)	01/88	6420-COB
	Power Development Plan (English and French)	03/90	106/90
Côte d'Ivoire	Energy Assessment (English and French)	04/85	5250-IVC
	Improved Biomass Utilization (English and French)	04/87	069/87

Region/Country	*Activity/Report Title*	*Date*	*Number*
Côte d'Ivoire	Power System Efficiency Study (English)	12/87	--
	Power Sector Efficiency Study (French)	02/92	140/91
	Project of Energy Efficiency in Buildings (English)	09/95	175/95
Ethiopia	Energy Assessment (English)	07/84	4741-ET
	Power System Efficiency Study (English)	10/85	045/85
	Agricultural Residue Briquetting Pilot Project (English)	12/86	062/86
	Bagasse Study (English)	12/86	063/86
	Cooking Efficiency Project (English)	12/87	--
	Energy Assessment (English)	02/96	179/96
Gabon	Energy Assessment (English)	07/88	6915-GA
The Gambia	Energy Assessment (English)	11/83	4743-GM
	Solar Water Heating Retrofit Project (English)	02/85	030/85
	Solar Photovoltaic Applications (English)	03/85	032/85
	Petroleum Supply Management Assistance (English)	04/85	035/85
Ghana	Energy Assessment (English)	11/86	6234-GH
	Energy Rationalization in the Industrial Sector (English)	06/88	084/88
	Sawmill Residues Utilization Study (English)	11/88	074/87
	Industrial Energy Efficiency (English)	11/92	148/92
Guinea	Energy Assessment (English)	11/86	6137-GUI
	Household Energy Strategy (English and French)	01/94	163/94
Guinea-Bissau	Energy Assessment (English and Portuguese)	08/84	5083-GUB
	Recommended Technical Assistance Projects (English & Portuguese)	04/85	033/85
	Management Options for the Electric Power and Water Supply Subsectors (English)	02/90	100/90
	Power and Water Institutional Restructuring (French)	04/91	118/91
Kenya	Energy Assessment (English)	05/82	3800-KE
	Power System Efficiency Study (English)	03/84	014/84
	Status Report (English)	05/84	016/84
	Coal Conversion Action Plan (English)	02/87	--
	Solar Water Heating Study (English)	02/87	066/87
	Peri-Urban Woodfuel Development (English)	10/87	076/87
	Power Master Plan (English)	11/87	--
	Power Loss Reduction Study (English)	09/96	186/96
Lesotho	Energy Assessment (English)	01/84	4676-LSO
Liberia	Energy Assessment (English)	12/84	5279-LBR
	Recommended Technical Assistance Projects (English)	06/85	038/85
	Power System Efficiency Study (English)	12/87	081/87
Madagascar	Energy Assessment (English)	01/87	5700-MAG
	Power System Efficiency Study (English and French)	12/87	075/87
	Environmental Impact of Woodfuels (French)	10/95	176/95
Malawi	Energy Assessment (English)	08/82	3903-MAL
	Technical Assistance to Improve the Efficiency of Fuelwood Use in the Tobacco Industry (English)	11/83	009/83
	Status Report (English)	01/84	013/84
Mali	Energy Assessment (English and French)	11/91	8423-MLI
	Household Energy Strategy (English and French)	03/92	147/92
Islamic Republic of Mauritania	Energy Assessment (English and French)	04/85	5224-MAU
	Household Energy Strategy Study (English and French)	07/90	123/90
Mauritius	Energy Assessment (English)	12/81	3510-MAS
	Status Report (English)	10/83	008/83

Region/Country	*Activity/Report Title*	*Date*	*Number*
Mauritius	Power System Efficiency Audit (English)	05/87	070/87
	Bagasse Power Potential (English)	10/87	077/87
	Energy Sector Review (English)	12/94	3643-MAS
Mozambique	Energy Assessment (English)	01/87	6128-MOZ
	Household Electricity Utilization Study (English)	03/90	113/90
	Electricity Tariffs Study (English)	06/96	181/96
	Sample Survey of Low Voltage Electricity Customers	06/97	195/97
Namibia	Energy Assessment (English)	03/93	11320-NAM
Niger	Energy Assessment (French)	05/84	4642-NIR
	Status Report (English and French)	02/86	051/86
	Improved Stoves Project (English and French)	12/87	080/87
	Household Energy Conservation and Substitution (English and French)	01/88	082/88
Nigeria	Energy Assessment (English)	08/83	4440-UNI
	Energy Assessment (English)	07/93	11672-UNI
Rwanda	Energy Assessment (English)	06/82	3779-RW
	Status Report (English and French)	05/84	017/84
	Improved Charcoal Cookstove Strategy (English and French)	08/86	059/86
	Improved Charcoal Production Techniques (English and French)	02/87	065/87
	Energy Assessment (English and French)	07/91	8017-RW
	Commercialization of Improved Charcoal Stoves and Carbonization Techniques Mid-Term Progress Report (English and French)	12/91	141/91
SADC	SADC Regional Power Interconnection Study, Vols. I-IV (English)	12/93	--
SADCC	SADCC Regional Sector: Regional Capacity-Building Program for Energy Surveys and Policy Analysis (English)	11/91	--
Sao Tome and Principe	Energy Assessment (English)	10/85	5803-STP
Senegal	Energy Assessment (English)	07/83	4182-SE
	Status Report (English and French)	10/84	025/84
	Industrial Energy Conservation Study (English)	05/85	037/85
	Preparatory Assistance for Donor Meeting (English and French)	04/86	056/86
	Urban Household Energy Strategy (English)	02/89	096/89
	Industrial Energy Conservation Program (English)	05/94	165/94
Seychelles	Energy Assessment (English)	01/84	4693-SEY
	Electric Power System Efficiency Study (English)	08/84	021/84
Sierra Leone	Energy Assessment (English)	10/87	6597-SL
Somalia	Energy Assessment (English)	12/85	5796-SO
South Africa Republic of	Options for the Structure and Regulation of Natural Gas Industry (English)	05/95	172/95
Sudan	Management Assistance to the Ministry of Energy and Mining	05/83	003/83
	Energy Assessment (English)	07/83	4511-SU
	Power System Efficiency Study (English)	06/84	018/84
	Status Report (English)	11/84	026/84
	Wood Energy/Forestry Feasibility (English)	07/87	073/87
Swaziland	Energy Assessment (English)	02/87	6262-SW
	Household Energy Strategy Study	10/97	198/97
Tanzania	Energy Assessment (English)	11/84	4969-TA
	Peri-Urban Woodfuels Feasibility Study (English)	08/88	086/88
	Tobacco Curing Efficiency Study (English)	05/89	102/89
	Remote Sensing and Mapping of Woodlands (English)	06/90	--
	Industrial Energy Efficiency Technical Assistance (English)	08/90	122/90

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Tanzania	Power Loss Reduction Volume 1: Transmission and Distribution SystemTechnical Loss Reduction and Network Development (English)	06/98	204A/98
	Power Loss Reduction Volume 2: Reduction of Non-Technical Losses (English)	06/98	204B/98
Togo	Energy Assessment (English)	06/85	5221-TO
	Wood Recovery in the Nangbeto Lake (English and French)	04/86	055/86
	Power Efficiency Improvement (English and French)	12/87	078/87
Uganda	Energy Assessment (English)	07/83	4453-UG
	Status Report (English)	08/84	020/84
	Institutional Review of the Energy Sector (English)	01/85	029/85
	Energy Efficiency in Tobacco Curing Industry (English)	02/86	049/86
	Fuelwood/Forestry Feasibility Study (English)	03/86	053/86
	Power System Efficiency Study (English)	12/88	092/88
	Energy Efficiency Improvement in the Brick and Tile Industry (English)	02/89	097/89
	Tobacco Curing Pilot Project (English)	03/89	UNDP Terminal Report
	Energy Assessment (English)	12/96	193/96
	Rural Electrification Strategy Study	09/99	221/99
Zaire	Energy Assessment (English)	05/86	5837-ZR
Zambia	Energy Assessment (English)	01/83	4110-ZA
	Status Report (English)	08/85	039/85
	Energy Sector Institutional Review (English)	11/86	060/86
	Power Subsector Efficiency Study (English)	02/89	093/88
	Energy Strategy Study (English)	02/89	094/88
	Urban Household Energy Strategy Study (English)	08/90	121/90
Zimbabwe	Energy Assessment (English)	06/82	3765-ZIM
	Power System Efficiency Study (English)	06/83	005/83
	Status Report (English)	08/84	019/84
	Power Sector Management Assistance Project (English)	04/85	034/85
	Power Sector Management Institution Building (English)	09/89	--
	Petroleum Management Assistance (English)	12/89	109/89
	Charcoal Utilization Prefeasibility Study (English)	06/90	119/90
	Integrated Energy Strategy Evaluation (English)	01/92	8768-ZIM
	Energy Efficiency Technical Assistance Project: Strategic Framework for a National Energy Efficiency Improvement Program (English)	04/94	--
	Capacity Building for the National Energy Efficiency Improvement Programme (NEEIP) (English)	12/94	--
	Rural Electrification Study	03/00	228/00
	EAST ASIA AND PACIFIC (EAP)		
Asia Regional	Pacific Household and Rural Energy Seminar (English)	11/90	--
China	County-Level Rural Energy Assessments (English)	05/89	101/89
	Fuelwood Forestry Preinvestment Study (English)	12/89	105/89
	Strategic Options for Power Sector Reform in China (English)	07/93	156/93
	Energy Efficiency and Pollution Control in Township and Village Enterprises (TVE) Industry (English)	11/94	168/94

Region/Country	*Activity/Report Title*	*Date*	*Number*
China	Energy for Rural Development in China: An Assessment Based on a Joint Chinese/ESMAP Study in Six Counties (English)	06/96	183/96
	Improving the Technical Efficiency of Decentralized Power Companies	09/99	222/999
Fiji	Energy Assessment (English)	06/83	4462-FIJ
Indonesia	Energy Assessment (English)	11/81	3543-IND
	Status Report (English)	09/84	022/84
	Power Generation Efficiency Study (English)	02/86	050/86
	Energy Efficiency in the Brick, Tile and Lime Industries (English)	04/87	067/87
	Diesel Generating Plant Efficiency Study (English)	12/88	095/88
	Urban Household Energy Strategy Study (English)	02/90	107/90
	Biomass Gasifier Preinvestment Study Vols. I & II (English)	12/90	124/90
	Prospects for Biomass Power Generation with Emphasis on Palm Oil, Sugar, Rubberwood and Plywood Residues (English)	11/94	167/94
Lao PDR	Urban Electricity Demand Assessment Study (English)	03/93	154/93
	Institutional Development for Off-Grid Electrification	06/99	215/99
Malaysia	Sabah Power System Efficiency Study (English)	03/87	068/87
	Gas Utilization Study (English)	09/91	9645-MA
Myanmar	Energy Assessment (English)	06/85	5416-BA
Papua New Guinea	Energy Assessment (English)	06/82	3882-PNG
	Status Report (English)	07/83	006/83
	Energy Strategy Paper (English)	--	--
	Institutional Review in the Energy Sector (English)	10/84	023/84
	Power Tariff Study (English)	10/84	024/84
Philippines	Commercial Potential for Power Production from Agricultural Residues (English)	12/93	157/93
	Energy Conservation Study (English)	08/94	--
Solomon Islands	Energy Assessment (English)	06/83	4404-SOL
	Energy Assessment (English)	01/92	979-SOL
South Pacific	Petroleum Transport in the South Pacific (English)	05/86	--
Thailand	Energy Assessment (English)	09/85	5793-TH
	Rural Energy Issues and Options (English)	09/85	044/85
	Accelerated Dissemination of Improved Stoves and Charcoal Kilns (English)	09/87	079/87
	Northeast Region Village Forestry and Woodfuels Preinvestment Study (English)	02/88	083/88
	Impact of Lower Oil Prices (English)	08/88	--
	Coal Development and Utilization Study (English)	10/89	--
Tonga	Energy Assessment (English)	06/85	5498-TON
Vanuatu	Energy Assessment (English)	06/85	5577-VA
Vietnam	Rural and Household Energy-Issues and Options (English)	01/94	161/94
	Power Sector Reform and Restructuring in Vietnam: Final Report to the Steering Committee (English and Vietnamese)	09/95	174/95
	Household Energy Technical Assistance: Improved Coal Briquetting and Commercialized Dissemination of Higher Efficiency Biomass and Coal Stoves (English)	01/96	178/96
Western Samoa	Energy Assessment (English)	06/85	5497-WSO

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	SOUTH ASIA (SAS)		
Bangladesh	Energy Assessment (English)	10/82	3873-BD
	Priority Investment Program (English)	05/83	002/83
	Status Report (English)	04/84	015/84
Bangladesh	Power System Efficiency Study (English)	02/85	031/85
	Small Scale Uses of Gas Prefeasibility Study (English)	12/88	--
India	Opportunities for Commercialization of Nonconventional Energy Systems (English)	11/88	091/88
	Maharashtra Bagasse Energy Efficiency Project (English)	07/90	120/90
	Mini-Hydro Development on Irrigation Dams and Canal Drops Vols. I, II and III (English)	07/91	139/91
	WindFarm Pre-Investment Study (English)	12/92	150/92
	Power Sector Reform Seminar (English)	04/94	166/94
	Environmental Issues in the Power Sector (English)	06/98	205/98
	Environmental Issues in the Power Sector: Manual for Environmental Decision Making (English)	06/99	213/99
	Household Energy Strategies for Urban India: The Case of Hyderabad	06/99	214/99
Nepal	Energy Assessment (English)	08/83	4474-NEP
	Status Report (English)	01/85	028/84
	Energy Efficiency & Fuel Substitution in Industries (English)	06/93	158/93
Pakistan	Household Energy Assessment (English)	05/88	--
	Assessment of Photovoltaic Programs, Applications, and Markets (English)	10/89	103/89
	National Household Energy Survey and Strategy Formulation Study: Project Terminal Report (English)	03/94	--
	Managing the Energy Transition (English)	10/94	--
	Lighting Efficiency Improvement Program Phase 1: Commercial Buildings Five Year Plan (English)	10/94	--
Sri Lanka	Energy Assessment (English)	05/82	3792-CE
	Power System Loss Reduction Study (English)	07/83	007/83
	Status Report (English)	01/84	010/84
	Industrial Energy Conservation Study (English)	03/86	054/86
	EUROPE AND CENTRAL ASIA (ECA)		
Bulgaria	Natural Gas Policies and Issues (English)	10/96	188/96
Central and Eastern Europe	Power Sector Reform in Selected Countries	07/97	196/97
Eastern Europe	The Future of Natural Gas in Eastern Europe (English)	08/92	149/92
Kazakhstan	Natural Gas Investment Study, Volumes 1, 2 & 3	12/97	199/97
Kazakhstan & Kyrgyzstan	Opportunities for Renewable Energy Development	11/97	16855-KAZ
Poland	Energy Sector Restructuring Program Vols. I-V (English)	01/93	153/93
	Natural Gas Upstream Policy (English and Polish)	08/98	206/98
	Energy Sector Restructuring Program: Establishing the Energy Regulation Authority	10/98	208/98
Portugal	Energy Assessment (English)	04/84	4824-PO
Romania	Natural Gas Development Strategy (English)	12/96	192/96
Slovenia	Workshop on Private Participation in the Power Sector (English)	02/99	211/99

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Turkey	Energy Assessment (English)	03/83	3877-TU
	Energy and the Environment: Issues and Options Paper	04/00	229/00
	MIDDLE EAST AND NORTH AFRICA (MNA)		
Arab Republic of Egypt	Energy Assessment (English)	10/96	189/96
	Energy Assessment (English and French)	03/84	4157-MOR
	Status Report (English and French)	01/86	048/86
Morocco	Energy Sector Institutional Development Study (English and French)	07/95	173/95
	Natural Gas Pricing Study (French)	10/98	209/98
	Gas Development Plan Phase II (French)	02/99	210/99
Syria	Energy Assessment (English)	05/86	5822-SYR
	Electric Power Efficiency Study (English)	09/88	089/88
	Energy Efficiency Improvement in the Cement Sector (English)	04/89	099/89
Syria	Energy Efficiency Improvement in the Fertilizer Sector (English)	06/90	115/90
Tunisia	Fuel Substitution (English and French)	03/90	--
	Power Efficiency Study (English and French)	02/92	136/91
	Energy Management Strategy in the Residential and Tertiary Sectors (English)	04/92	146/92
	Renewable Energy Strategy Study, Volume I (French)	11/96	190A/96
	Renewable Energy Strategy Study, Volume II (French)	11/96	190B/96
Yemen	Energy Assessment (English)	12/84	4892-YAR
	Energy Investment Priorities (English)	02/87	6376-YAR
	Household Energy Strategy Study Phase I (English)	03/91	126/91
	LATIN AMERICA AND THE CARIBBEAN (LAC)		
LAC Regional	Regional Seminar on Electric Power System Loss Reduction in the Caribbean (English)	07/89	--
	Elimination of Lead in Gasoline in Latin America and the Caribbean (English and Spanish)	04/97	194/97
	Elimination of Lead in Gasoline in Latin America and the Caribbean - Status Report (English and Spanish)	12/97	200/97
	Harmonization of Fuels Specifications in Latin America and the Caribbean (English and Spanish)	06/98	203/98
Bolivia	Energy Assessment (English)	04/83	4213-BO
	National Energy Plan (English)	12/87	--
	La Paz Private Power Technical Assistance (English)	11/90	111/90
	Prefeasibility Evaluation Rural Electrification and Demand Assessment (English and Spanish)	04/91	129/91
	National Energy Plan (Spanish)	08/91	131/91
	Private Power Generation and Transmission (English)	01/92	137/91
	Natural Gas Distribution: Economics and Regulation (English)	03/92	125/92
	Natural Gas Sector Policies and Issues (English and Spanish)	12/93	164/93
	Household Rural Energy Strategy (English and Spanish)	01/94	162/94
	Preparation of Capitalization of the Hydrocarbon Sector	12/96	191/96
Brazil	Energy Efficiency & Conservation: Strategic Partnership for Energy Efficiency in Brazil (English)	01/95	170/95

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Brazil	Hydro and Thermal Power Sector Study	09/97	197/97
Chile	Energy Sector Review (English)	08/88	7129-CH
Colombia	Energy Strategy Paper (English)	12/86	--
	Power Sector Restructuring (English)	11/94	169/94
Colombia	Energy Efficiency Report for the Commercial and Public Sector (English)	06/96	184/96
Costa Rica	Energy Assessment (English and Spanish)	01/84	4655-CR
	Recommended Technical Assistance Projects (English)	11/84	027/84
	Forest Residues Utilization Study (English and Spanish)	02/90	108/90
Dominican Republic	Energy Assessment (English)	05/91	8234-DO
Ecuador	Energy Assessment (Spanish)	12/85	5865-EC
	Energy Strategy Phase I (Spanish)	07/88	--
	Energy Strategy (English)	04/91	--
	Private Minihydropower Development Study (English)	11/92	--
	Energy Pricing Subsidies and Interfuel Substitution (English)	08/94	11798-EC
	Energy Pricing, Poverty and Social Mitigation (English)	08/94	12831-EC
Guatemala	Issues and Options in the Energy Sector (English)	09/93	12160-GU
Haiti	Energy Assessment (English and French)	06/82	3672-HA
	Status Report (English and French)	08/85	041/85
	Household Energy Strategy (English and French)	12/91	143/91
Honduras	Energy Assessment (English)	08/87	6476-HO
	Petroleum Supply Management (English)	03/91	128/91
Jamaica	Energy Assessment (English)	04/85	5466-JM
	Petroleum Procurement, Refining, and Distribution Study (English)	11/86	061/86
	Energy Efficiency Building Code Phase I (English)	03/88	--
	Energy Efficiency Standards and Labels Phase I (English)	03/88	--
	Management Information System Phase I (English)	03/88	--
	Charcoal Production Project (English)	09/88	090/88
	FIDCO Sawmill Residues Utilization Study (English)	09/88	088/88
	Energy Sector Strategy and Investment Planning Study (English)	07/92	135/92
Mexico	Improved Charcoal Production Within Forest Management for the State of Veracruz (English and Spanish)	08/91	138/91
	Energy Efficiency Management Technical Assistance to the Comision Nacional para el Ahorro de Energia (CONAE) (English)	04/96	180/96
Panama	Power System Efficiency Study (English)	06/83	004/83
Paraguay	Energy Assessment (English)	10/84	5145-PA
	Recommended Technical Assistance Projects (English)	09/85	--
	Status Report (English and Spanish)	09/85	043/85
Peru	Energy Assessment (English)	01/84	4677-PE
	Status Report (English)	08/85	040/85
	Proposal for a Stove Dissemination Program in the Sierra (English and Spanish)	02/87	064/87
	Energy Strategy (English and Spanish)	12/90	--
	Study of Energy Taxation and Liberalization of the Hydrocarbons Sector (English and Spanish)	120/93	159/93
	Reform and Privatization in the Hydrocarbon Sector (English and Spanish)	07/99	216/99
Saint Lucia	Energy Assessment (English)	09/84	5111-SLU
St. Vincent and the Grenadines	Energy Assessment (English)	09/84	5103-STV

Region/Country	*Activity/Report Title*	*Date*	*Number*
Sub Andean	Environmental and Social Regulation of Oil and Gas Operations in Sensitive Areas of the Sub-Andean Basin (English and Spanish)	07/99	217/99
Trinidad and Tobago	Energy Assessment (English)	12/85	5930-TR
	GLOBAL		
	Energy End Use Efficiency: Research and Strategy (English)	11/89	--
	Women and Energy--A Resource Guide		
	The International Network: Policies and Experience (English)	04/90	--
	Guidelines for Utility Customer Management and Metering (English and Spanish)	07/91	--
	Assessment of Personal Computer Models for Energy Planning in Developing Countries (English)	10/91	--
	Long-Term Gas Contracts Principles and Applications (English)	02/93	152/93
	Comparative Behavior of Firms Under Public and Private Ownership (English)	05/93	155/93
	Development of Regional Electric Power Networks (English)	10/94	--
	Roundtable on Energy Efficiency (English)	02/95	171/95
	Assessing Pollution Abatement Policies with a Case Study of Ankara (English)	11/95	177/95
	A Synopsis of the Third Annual Roundtable on Independent Power Projects: Rhetoric and Reality (English)	08/96	187/96
	Rural Energy and Development Roundtable (English)	05/98	202/98
	A Synopsis of the Second Roundtable on Energy Efficiency: Institutional and Financial Delivery Mechanisms (English)	09/98	207/98
	The Effect of a Shadow Price on Carbon Emission in the Energy Portfolio of the World Bank: A Carbon Backcasting Exercise (English)	02/99	212/99
	Increasing the Efficiency of Gas Distribution Phase 1: Case Studies and Thematic Data Sheets	07/99	218/99
	Global Energy Sector Reform in Developing Countries: A Scorecard	07/99	219/99
	Global Lighting Services for the Poor Phase II: Text Marketing of Small "Solar" Batteries for Rural Electrification Purposes	08/99	220/99
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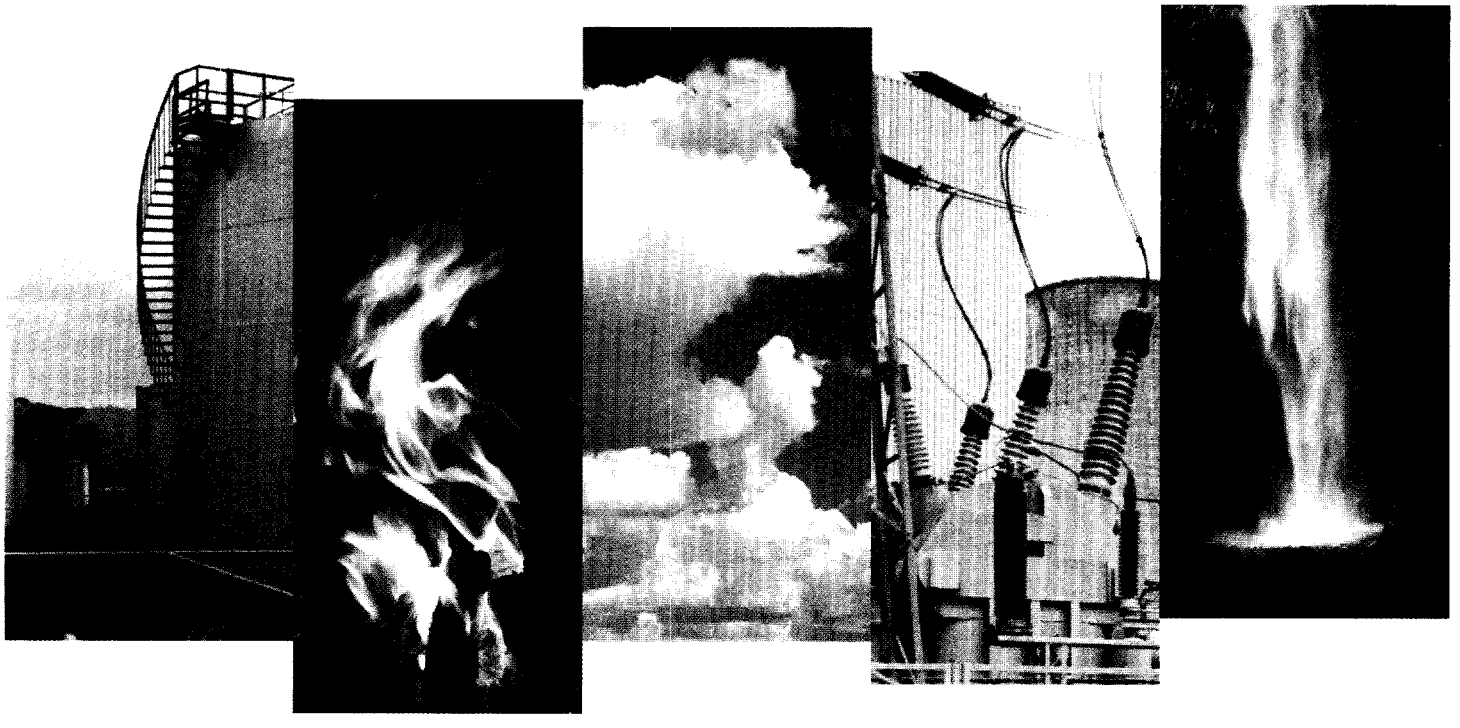

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