North Africa • Morocco

Maison Energy: Micro Entreprise for Rural Energy Access

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Sector • Solar Power
Enterprise Class • Government Initiative
Executive Summary

Access to energy remains one of the main challenges facing developing countries in the South. Morocco, a developing country in North Africa is no exception. Despite the country’s aggressive national energy strategy, about two million of the total population remains without access to electricity. They mainly live in low density villages in remote areas. These villages are characterized by scattered and unevenly distributed homes which makes their connection to the national power grid very difficult. As a solution, the National Office of Electricity (ONE)\(^1\) opted for a decentralized system of electrification using renewable energies such as wind, solar and hydroelectric power. Several programs were initiated by the government in partnership with national and international organizations such as UNDP with the aim of providing energy to those impoverished remote population. These programs, along with ONE’s effort, have led to an increase in the electrification rate in Morocco from 18% in 1995 to 94% in 2007.\(^2\)

Maison Energie (ME)\(^3\) is one of these programs. It was initiated in 1997 and was funded by UNDP in collaboration with many partners including the Center for Renewable Energy Development (CDER)\(^4\), the Ministry of Energy and Mines (MEM), ONE and several other private and public organizations and associations. The main objectives of the ME program are: (1) to provide energy access to remote areas using renewable energies, (2) to lower the use of wood and hence protect the forests and the environment, and (3) to create employment in rural areas thus providing income generating opportunities.

A Maison Energie is a micro-enterprise that commercializes various forms of solar energy including photovoltaic systems, solar water heaters and ovens in rural and peri-urban areas. Owners of the micro-enterprise are local young entrepreneurs. In addition to selling energy equipments and related accessories they provide installation and maintenance services and also distribute Liquid Petroleum Gas cylinders. These entrepreneurs are typically young unemployed citizens living in rural or peri-urban areas. Several organizations both public and private are involved in selecting, training and supporting these entrepreneurs in the development of their business plan, creation and implementation of their ME micro-enterprise. These organizations contribute either by providing funds to support the program or services such as interviewing candidates, business and technical training, support and follow up.

The Maison Energie program faces several constraints such as access to financial resources, lack of a supporting, encouraging environment for the creation of micro-enterprise and unfavorable market conditions of the renewable energy services. Hence, the objective of creating 1,000 MEs by 2008 was not fully achieved. Only 300 MEs are fully operational as of

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1 Office National de L’Electricité (ONE)
3 Maison Energie in French is the equivalent of ‘energy house’.
4 Centre de Développement des Energies Renouvelables (CDER)
2009. However, it is believed that the program has huge potential for success in the future. In fact, officials of the Center of Renewable Energy Development (CDER) confirmed that despite the above mentioned constraints there is still potential for 2,000 to 4,000 MEs in both rural and urban areas.

The Maison Energie program has several positive social, economic and environmental impacts. Through this program several villages now have access to electricity, several jobs have been created and CO₂ emissions are reduced through the use of photovoltaic systems.

Introduction

Maison Energie (ME) is a national program in Morocco aiming at promoting the creation of micro-enterprises by young entrepreneurs to market and promote renewable energy services in rural areas that lack access to the national grid-based energy. In Morocco, there are about two million people mainly in rural areas that still lack access to the national grid system. These people live in remote villages where the distance between homes and from homes to the grid makes it difficult to connect them to the national electricity grid. When people lack access to energy, they lack access to basic needs of heating, lighting and the possibility to harness energy for income generating activities and more productive uses which could help them escape from a vicious cycle of poverty. Lack of access to energy increases gender inequality.⁵ Women and young girls spend hours per day collecting firewood and often they suffer from respiratory diseases caused by smoke inhalation while cooking.

In order to remedy this situation and alleviate poverty, the Moroccan Government formulated a national energy strategy aiming at expanding energy access in the country. The ME program, which was initiated in 1997, falls under this national energy strategy. One of the goals of this strategy is to develop domestic energy resources such as solar, wind and hydroelectric power and rely less on energy imports. About 97% of Morocco’s energy needs are imported, yet the country is very rich in untapped renewable energy resources. Hence, the government has set an objective to have renewable energies represent 10% of the energy balance and 20% of power generation by 2012.⁶

The ME program was initially launched by the UNDP in partnership with the Ministry of Energy and Mines (MEM), the Center for Renewable Energy Development (CDER), and the National Office of Electricity (ONE). These partners contributed a total budget of US$1.5 million. The initial pilot phase of the ME program led to the creation of 150 ME micro-enterprises which were fully operational by 2004. Today, there are 300 operational ME micro-enterprises, 42% of which are in rural areas. A ME (Energy house) is a micro-


⁶ Ministère de l’Energie et des Mines
enterprise that commercializes various forms of solar energy including photovoltaic (PV) systems, solar water heaters and ovens in rural and peri-urban areas. Despite its potential for growth, the ME program has faced several challenges which has hindered its full development. These challenges are related but not limited to access to financial resources, lack of a supporting, encouraging environment for the creation of micro-enterprises and unfavorable market conditions for renewable energy services.

### Market and Location Context

Morocco is a North African country that relies heavily on importation for its energy needs. In fact, 97% of the country’s energy needs are imported. In 2008, the energy bill amounted to US$5.75 billion. As can be seen in Figure 1, total energy consumption soared from 4.6 Mtoe (Million tons of oil equivalents) in 1980 to 13.1 Mtoe in 2007. National electricity consumption alone jumped from 4,460 GWH in 1980 to 21,104 GWH in 2006. This consumption has been growing at 7% to 8% per annum over the last few years while the GDP growth rate has been between 3% and 4%. The growth rate of energy consumption is mainly due to the economic development that the country is experiencing. According to the African Development Bank, Morocco has achieved an economic growth of 5.4% in 2009 compared to 5.7% in 2008 despite the financial crisis.\(^8\)

![Figure 1: Primary Energy Consumption](source: Benkhadra, 2008)

As energy consumption continued to grow and oil prices continued to rise, the government of Morocco had to turn to the important but untapped potentials of renewable energies. Additionally, the need to expand electrification to the whole Moroccan population and the high connection costs that could not be assumed by the local populations have led the Moroccan Government to opt for decentralized rural electrification using photovoltaic kits. Hence, Morocco developed a national energy strategy that aims at diversifying its energy


\(^8\) Afrol News, (2009) “Morocco records 5.4% economic growth in 2009”
sources, using renewable energies, while protecting the environment. This new strategy aims at an energy saving of nearly 800 Mtoe. As reported by Mr. Mohamed Berdai from CDER, “Renewable energies represent 0.4% of the national energy balance (excluding biomass) and nearly 10% of electricity production, supported by strong hydropower sources and the newly installed wind energy parks (64 MW installed and 240 MW under deployment).” Morocco has enormous potential for renewable energy sources: wind energy potential is estimated at 6,000 MW, solar energy is estimated at 5KWH/m²/day (see Figure 2), and for hydraulic and tidal power, Morocco has 3,500 km of coastal line. All these favorable conditions make renewable energies a viable solution to Morocco’s energy challenge. In November 2009, His Majesty King Mohamed VI launched a US$9 billion solar energy project aiming at producing 38% of the country’s installed power generation by 2020.

Despite the increase in energy consumption, about 6% of the population still lack access to energy, mainly electricity. Access to energy can vastly improve living conditions and enhance productivity. It can curb exodus by facilitating income-generating activities. Additionally, without access to energy these areas cannot benefit from some development programs such as GENIE, which is a government program aiming at bringing computers and Internet to middle and high schools or the ‘Plan Maroc Vert’ (Green Morocco Plan) destined to develop a more modern agricultural sector by introducing new technologies some of which require access to energy. Back in 1996, 150,000 households were identified as being costly and difficult to

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10 Ibid, p.4
connect to the national grid.\textsuperscript{11} Hence, in 1994 ONE launched a program known as the global rural electrification program (PERG) to supply electricity throughout the country.\textsuperscript{12} Photovoltaic systems were deemed a viable solution to bring electricity to these remote areas. In 1997, the Maison Energie program was launched to improve energy distribution in rural areas using PV systems.

Hence, one of the roles of the Maison Energie is to serve as a vehicle to distribute and promote the use of renewable energies, increase awareness and have proximity in service delivery and support. ONE has contracted several private companies in order to ensure the implementation of the photovoltaic systems in 150,000 households. These include TEMASOL, ISOFOTON, PBSOLAIRE and SUN LIGHT POWER all of which are subsidiaries of solar energy companies from different countries such as France, Spain, and the United States. These companies have in turn subcontracted the MEs for some of these projects especially because the MEs have the local market knowledge and the expertise needed to successfully implement and install the photovoltaic systems. In addition to proximity, the MEs also serve as a link between the community and the energy companies since the owners are from the area and understand better the environment than an outsider.

**Description of the Business Model**

**FINANCIAL MODEL**

The ME program was initially funded by UNDP in collaboration with many partners including the Center for Renewable Energy Development (CDER)\textsuperscript{13}, the Ministry of Energy and Mines and ONE who contributed a total of US$1.5 million. These funds were primarily used for ME development activities which consists of five phases namely prospecting, selecting, training, supporting and following up of the young entrepreneurs. These development activities cost between US$1,500 to US$2,000 per ME (see Table 1). However, the startup cost of each ME (consisting of inventory, remodeling, store fixtures and working capital) is about US$10,000, excluding the purchase price of the business premise (see Table 2). The young entrepreneurs generally finance the startup costs through bank loans. Several public and private actors contribute to the implementation and execution of the ME program.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Cost in USD (before tax)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection</td>
<td>14</td>
</tr>
<tr>
<td>Business Training</td>
<td>80</td>
</tr>
<tr>
<td>Technical Training – Solar water heater systems (SWH)</td>
<td>200</td>
</tr>
</tbody>
</table>


\textsuperscript{13} Centre de développement des énergies renouvelables (CDER)
<table>
<thead>
<tr>
<th>Action</th>
<th>Cost in USD (before tax)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Training – Photovoltaic Kits (PV)</td>
<td>200</td>
</tr>
<tr>
<td>Technical Training - Pompage</td>
<td>70</td>
</tr>
<tr>
<td>Accreditation (SWH and PV)</td>
<td>70</td>
</tr>
<tr>
<td>ICT Training</td>
<td>140</td>
</tr>
<tr>
<td>Follow up</td>
<td>670</td>
</tr>
<tr>
<td>Total</td>
<td>1444</td>
</tr>
</tbody>
</table>

*Source: Touzani, 2007*

### Table 2: Cost per ME - Entrepreneur's part

<table>
<thead>
<tr>
<th>Action</th>
<th>Cost in USD (before tax)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remodeling and store fixtures</td>
<td>Between 670-1340</td>
</tr>
<tr>
<td>Stock of basic equipment</td>
<td>2000 – 2670</td>
</tr>
<tr>
<td>Tools and Equipments</td>
<td>670-1340</td>
</tr>
<tr>
<td>Advertising</td>
<td>270 – 670</td>
</tr>
<tr>
<td>Inventory</td>
<td>2670 – 4000</td>
</tr>
<tr>
<td>Working Capital</td>
<td>1340 -2670</td>
</tr>
<tr>
<td>Total</td>
<td>7620 – 12690</td>
</tr>
</tbody>
</table>

*Source: Touzani, 2007*

The ME program initially covered five out of the 16 regions of Morocco (see Figure 3). These include Sous-Massaa-Daraa, Rabat-Sale-Zemmour-Zaer, Tadla-Azilal, Oriental, Meknes-Tafilalt. When the ME program was initiated in 1997, the main goal of its pilot phase was to create 100 MEs in the five, above mentioned, rural regions of Morocco. In 2004, 150 MEs were fully operational. Given the relative success of the pilot phase, the generalization phase of the project was then launched in 2004 with the aim to create 1,000 MEs not only in rural areas but in urban areas as well.
MAISON ENERGIE PROGRAM DEVELOPMENT ACTIVITIES

The five phases of the ME program are as follows:

1. **Prospecting**

   This first phase is the cornerstone of the project since it allows for reaching a large number of candidates among project holders, unemployed, and new college graduates. Two partners namely ANAPEC\(^{14}\), the national agency for the promotion of employment, and ONE contribute to this phase by increasing awareness about the ME program through their own network. The current prospecting is done mainly through advertisement in the newspapers. Interested candidates respond to the ads by submitting an application to the CDER either in person, by mail or online via the Maison Energie website.\(^{15}\)

2. **Selection**

   The second phase consists of selecting candidates with the right entrepreneurial and technical profile. The criteria for selection are as follows:
   - Must be between 20-35 years old

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14 ANAPEC – Agence nationale de la promotion de l’emploi et des compétences
• Must have some form of training in the area of electricity, electronics and energy domain
• Must have some job experience
• A good knowledge of the local market
• Entrepreneurial profile and strong motivation

The selection is done through an interview process at the regional level. Different partners take part in the interview process, including:

• The Agency of Social Development (ADS) - a public institution dedicated to poverty reduction and social development in Morocco. In addition to participating in this phase, ADS provides funds to finance the costs of training, logistical support and monitoring, and technical support of the young entrepreneurs.
• The Banque Populaire Foundation for the Creation of Enterprises (FBPCE) - a not-for-profit association created by the Banque Populaire group with the aim to provide assistance and support to entrepreneurs wishing to start their own business.
• The Agency for the Promotion and Development of the North Region (APDN) is a governamental institution designed to ensure the development of the North region. Finally, ONE and MEM also participate in selecting candidates.

The average admission rate is about 30% which is relatively low. This is mainly due to the fact that several applicants do not fulfill the above mentioned admission requirements. The majority of the selected candidates does not have sufficient knowledge about the market, have limited business planning, sales and marketing skills and are computer illiterate.

3. Training
In order to better prepare these young entrepreneurs, CDER has developed a series of workshops and training sessions. Training is free of charge for the entrepreneurs. On average a training session lasts between five days to one week. Training is divided into three types: business, information and communication technologies (ICT) and technical training. The business training emphasizes more the managerial side of the enterprises as well as the challenges, risks and opportunities of the creation of an ME. The business training is ensured by FBPCE and Moukawalati, which is a government program that was launched in 2006 to promote entrepreneurship in the country and provide support to young entrepreneurs.

The ICT training is delivered by the ICT center which was created in 2005 as a partnership between Microsoft, CDER and UNDP-ICTDAR. The ICT center serves as a platform for ICT training of the ME owners, networking and technical knowledge sharing among all partners. The center developed a portal of the Maison Energie network PRESCOE. The ICT training consists of educating the ME owners on how to access information in the PRESCOE website and how to use Internet to find additional technical information about the products.

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16 Interview with Mr. Adbelkrim Touzani, CDER
17 UNDP-ICTDAR (Information and communication technologies for development in Arab Regions)
18 PRESCOE (Portail du Réseau des Entreprises de Services et de Commercialisation à vocation Energétique)
and services they provide. The Maison Energie owners are also trained on solar panel dimension calculation software applications. These applications help them better serve their clients and be more accurate in their estimates.

In addition to business and ICT training, the young entrepreneurs also receive technical training which is very specific and is adapted to the specific conditions of the market of the ME whether it is in the rural or urban area. Technical training consists of learning the different types of devices, their installations and maintenance. It is provided by the CDER in cooperation with AMISOLE, the Moroccan Association of Solar and Wind industry which consists of all manufacturers and importers of renewable energies equipment as well as professionals whose main activity is related to renewable energies. At the end of the technical training workshops, all trainees have to take a test on the photovoltaic and solar water heater installations. Once they pass the test, the entrepreneurs then become accredited by CDER. This accreditation provides credibility to the quality of service provided by the ME. Among the challenges faced in this phase is the relatively high rate of absenteeism at 30% during the training sessions. This absenteeism is due to personal reasons, other new commitments or inability of some candidates to pay accommodation fees. Availability of trainers is another challenge in this phase. Moreover, young entrepreneurs deem the training sessions too short and insufficient for their needs.

4. Support
The support phase consists of providing the necessary assistance to the young entrepreneurs all along the process from selection to micro-enterprise creation. Support activities include helping the entrepreneurs with their feasibility study, business plan development and enterprise registration and creation. Prior to 2006, candidates were directed to their regional investment center (CRI) to help them set up their micro-enterprise. These centers are government entities created as one stop shops for new companies’ registration and investment assistance.

Starting 2006, selected candidates are encouraged to take advantage of the Moukawalati program which provides young entrepreneurs and project holders with investments up to US$20,000 to set up their own businesses, and support with securing financing. This program provides support before the launch of the project by assisting project holders in business plan creation and facilitating access to credit through banks. The government guarantees up to 85% of the granted credit in addition to providing an interest-free advance of 10% which should not exceed US$1,500. The admission process of the Moukawalati program is competitive. About 30% of the projects submitted to Moukawalati are rejected mainly on the basis of failing to meet

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19 Rapport d’Activité 2006
20 CRI - Centre Régional d’Investissements

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admission requirements. Hence, CDER coaches the selected ME program candidates on the Moukawalati admission process in order to increase their chances of being admitted to the program. Once admitted, Moukawalati accompanies the candidates in the creation of their business plan and their bank loans applications. Follow-up is also ensured through the PRESCO website where candidates can find tools and training documents that can help them along the way.

5. Follow-up
The last phase of the program is the follow-up which consists of assisting the young entrepreneurs in the pilot phase of their ME micro-enterprise. The follow-up unit within CDER ensures the implementation of the follow-up phase by providing one on one consultation. Additionally, the ICT center developed a multimedia toolkit in Arabic and French for the entrepreneurs that contains vital information and tools necessary for the success of their enterprise. The toolkit contains seven modules: Enterprise creation and Management, Marketing, Accounting, Purchasing and Cost Accounting, Inventory Management, and Human Resource Management. This toolkit is available on the PRESCOE portal. This toolkit allows the program to provide long-distance follow-up through the web portal. Additionally, the follow-up unit within the CDER remains an important point of contact for all ME owners to seek advice and support even after the pilot phase of their ME launch. They are especially needed to ensure that these MEs, which are micro-enterprises owned and run by young entrepreneurs in rural areas, not only market renewable energy products such as photovoltaic systems and solar water heaters but also to guarantee proper installation and maintenance services.

As presented above several partners participate in the development and implementation of the ME micro-enterprise. Figure 4 summarizes these interactions and linkages among the partners and the phases in which they contribute.

23 Maison Energie, http://www.maisonenergie.ma/
MAISON ENERGIE MICROENTREPRISE REVENUE MODEL

A Maison Energie can generate revenues in two ways: (1) by providing products and installations services directly to the customers. In this case the customer pays the ME directly and owns the equipments and is responsible for its maintenance expenses later on; (2) by being subcontracted by other larger companies such as TEMASOL, as mentioned above. When the MEs are subcontracted they only charge a one-time fee for installation, they do not provide the equipment as it is usually provided by the subcontracting company. In the case of TEMASOL, which is a French private company that has a service contract with ONE to supply 16,000 households in rural areas with solar energy, the ME gets US$40 per installation. The customer does not own the equipment and pays a monthly fee for connection and service. The equipment installed remains the property of ONE. Figure 5 illustrates this structure. The MEs are not obliged to subcontract with these companies such as TEMASOL; they do it at their own discretion.
THE VALUE PROPOSITION

The key value proposition of the Maison Energie program is its focus on providing energy access to rural remote areas that are difficult to connect to the national power grid. By providing energy for cooking, space heating and lighting homes, the lives of the people living in these areas will certainly improve.

For the entrepreneurs, the program Maison Energie offers an unprecedented income-generating opportunity. These young entrepreneurs who were unemployed sometimes even with education degrees and depending financially on their families, now have a job and enjoy financial independence. Additionally, they have gained new knowledge and expertise in the area of renewable energies, business management and ICT through the different training programs offered by the different partners.

Moreover, the ME program helps in protection of the environment by promoting the use of renewable energies such as solar energy hence reducing the use of kerosene and wood as fuel. It helps accelerate the electrification rate of rural areas, which is proven to improve the quality of life and stimulates productivity and education in developing countries. For example, with access to electricity young students can stay up late studying and doing their homework. When the roads are lit, kids can safely go to school and schools can extend...
schooling hours especially during winter when daylight is short. With access to energy, business can also stay open late and new income generating businesses can emerge.

**CONSTRAINTS AND SOLUTIONS**

There are several constraints that exist at different levels of the Maison Energie program that inhibit its potential growth. These constraints are summarized and categorized as follows:

**Lack of Knowledge and Skills:** Finding good entrepreneurs with the right profile and the necessary skills to run a successful ME is a major challenge in the program. In fact, the admission rate in the selection phase is as low as 30%. Candidates often lack basic business, marketing and sales skills and knowledge about the market. Additionally, the CDER faces difficulties accessing partners’ databases of potential candidates with technical background. Hence, CDER relies mainly on newspaper advertising to attract potential applicants which is an expensive alternative.

ONE has to overcome several obstacles in achieving its mission of spreading electrification throughout the country. For instance, some people living in these remote areas prefer to be connected to the power grid rather than using alternative energy sources especially when the electricity lines are relatively close to their homes and villages. The houses in these remote villages are unevenly distributed which make it difficult and not cost effective to connect them to the national grid. Additionally, ONE opts for the use of renewable energy solutions whenever the connection cost exceeds 27,000 MAD (US$3375). Lack of awareness about alternative energy sources such as solar energy and their advantages is an obstacle faced by ONE in these areas. That’s why the ME’s role is very crucial in this regard. Their proximity to the people in rural areas can facilitate bringing awareness about alternative energy sources and their benefits.

**Regulatory environment:** CDER faces an important challenge in the support and follow-up phases; the process is considered to be long, between six months to one year, and several candidates (about 50% of ME project holders) abandon the process of creating their micro-enterprises. For instance, the Moukawalati process is criticized for being very long and bureaucratic. The average period of the Moukawalati process alone can last between 14 and 18 months. Mr. Hamid Marbouhi was hoping to submit a project to Moukawalati, but a friend’s experience with the program put him off. He said "After several months of complex proceedings, his project was rejected. So I would rather save my time and effort. I also heard about other cases which were accepted but financing came too late." Aware of the above mentioned problems, the government is in the process of restructuring the Moukawalati program in order to encourage entrepreneurship throughout the country.

In addition, the market environment does not encourage the development of the renewable energy sector. Taxation is still considered high and not encouraging, even when the

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25 ibid
government had lowered the tax rate from 20% to 14% on solar water heater systems and photovoltaic kits. There are still too few national research and development (R&D) efforts to develop and upgrade equipment and services. Since most of the equipments are imported, the government lowered the importation tariff back in 1996 to 2.5% in order to encourage this sector. In addition, to promote quality the government has put in place mandatory quality standards through accreditation processes of product vendors and installation service providers such as the MEs. Concomitantly, in order to promote the MEs enterprises, the government has made it mandatory for all public tenders to require that the vendors and service providers must be accredited.

Access to Financial Resources: Locating funds especially for the follow up stage of the program is another important challenge since it is costly to follow up individual MEs that are scattered in different regions. CDER is always looking for partners to help with funding and is progressively transferring the management and execution of the ME program to the regions for better follow up and support.

Managing Partners: The ME program involves several partners that play important roles. However, some partners are often late in the disbursement of their contributions or commitments which slows the program growth. In fact, CDER representatives confirm the difficulties they face in managing the partners. “Each partner has its own difficulties” said Mr. Touzani of the Department of International Cooperation. This forces CDER to continuously look for new partners which is time consuming.

Low purchasing power: Poverty is a rural phenomenon in Morocco. There are 5.3 million Moroccans who live in poverty of whom 3 million live in rural areas. This represent a major challenge to ME owners who are selling their products and services in rural areas. In order to overcome this challenge, ME owners extend credits to their clients and accommodate their sporadic income often linked to crop cycles as illustrated in the case study presented below.

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Case Study • Maison Energie
MAISON ENERGIE CASE STUDY: SAMIA SOLAIRE

Mr. Abdellah Aharak is owner and director of SAMIA Solaire, a successful ME with four full time employees including himself. Samia Solaire is located in Boufekrane, a village about 15 km north of Meknes. In the year 2000, Mr. Aharak graduated with a degree in Mechanics from the University of Science and Technology. After his graduation, he was interested in solar energy as he saw an opportunity in rural areas. He started investigating the sector and looking for a job while seeking the help of ANAPEC, which directed him to the ME program. Intrigued by the opportunity, he applied and got selected after undergoing three or four interviews. According to Mr. Aharak, the selection process mainly focused on the motivation and ability to succeed in running a business. Once selected, he participated in technical and business training sessions twice a year in Marrakech. There were about 20 other young male entrepreneurs with him in the training. The technical training focused on PV, solar water heaters and solar water pumping installations and maintenance. The business training covered topics such as accounting, bookkeeping and business plan development. Each training session lasts between five to ten days. Training is free of charge, however each participant has to pay his/her own travel and accommodation expenses. These expenses did cost between 400 to US$550 which is relatively high for unemployed young entrepreneurs. Mr. Aharak believes that it was part of the sacrifices he had to make to attain his goal. He financed the project himself and started small. Today after five years of operations, Samia Solaire has installed hundreds of PV panels all over the Meknes-Tafilt region in rural areas. All its PV system clients are in rural areas. Samia Solaire also has a number of clients in urban areas mainly for the solar water heaters. It gets its products and equipments directly from suppliers. Its main supplier is TACASUN, an affiliate of a Dutch company. Most of the products and equipments are imported. Samia Solaire markets both new and used equipments.

The Jradi Village, one of the many villages in the area that lacked access to energy, is about 4 km away from Mr. Aharak’s shop. It finally enjoyed access to electricity thanks to Samia Solaire. Two years ago, Samia Solaire started installing PV systems in different homes of the village. A young girl living in the village who is in her last year of high school (baccalaureate) is very happy with the PV system in her home. She said “Succeeding in the baccalaureate is very crucial for my future and with the light provided by the PV system I can study late and not worry about running out of candles or butane gas in the middle of the night.”

The main problem Mr. Aharak faces today is the low purchasing power of buyers especially in rural areas. Selling used PV panels which cost 40% to 50% less than the new ones is one way he overcomes this challenge. He also extends credits to his clients who cannot pay in
full. “These poor people cannot pay in full, so they pay in small amounts and I know they will pay” stated Mr. Aharak. Trust is a very important factor in the success of his business especially in rural areas. He added “Once I install a PV system for a family, I become their friend. They invite me to eat in their home; they even give me live chicken and turkey as gifts for my family.” Despite the relatively high upfront expense of the PV systems, the long-term gains outweigh the cost. “Once a PV system is installed and running they do not have to buy anymore candles, gas, gasoil or charge batteries. With PV there are no smell, no smoke and best of all no monthly fees. It is clean, economic energy!” explained Mr. Aharak. One PV panel can generate power for up to four light bulbs and a colour TV. Mr. Aharak is able to extend credit to his clients because the suppliers provide him with a grace period which can last up to three months to pay for his inventory.

Another problem that Mr. Aharak faces in his business is the competition from freelancers and local hardware stores that provide similar services as his company. These indirect competitors are neither accredited nor trained on the proper installations of the different solar systems. Additionally, the equipment they sell may not necessarily be of best quality according to Mr. Aharak. Hence, clients run into technical problems soon after they install the systems and this “affects the image of the profession and the sector” said Mr. Aharak. To solve this problem, Mr. Aharak believes that the government should intervene by increasing awareness among the users and by prohibiting non-accredited solar systems installers.

Today, Samia Solaire is making enough revenues for Mr. Aharak to run the business, pay his three full time employees and comfortably raise a family of four children.

**Results Created by the Program**

**ACCESS TO ENERGY SERVICES**

The Maison Energie program brought energy services to people living in remote rural areas that would not otherwise have access to energy. Several MEs have helped in the installation of about 43,000 photovoltaic kits in different rural areas. Access to electricity has provided low-income communities with several benefits. Businesses can stay open late thus generating more income and boosting the local economy. Young pupils can extend their study hours in the evening. Citizens can watch TV and stay informed about what is happening in the rest of the world. People can also have cell phones and stay connected to the outside world. Remote
villages can benefit from other governmental development programs aiming at improving the lives of the poor in rural areas. Especially those requiring the use of energy such as project GENIE which aims at bringing computer labs and the Internet to 3,000 middle and high schools all over the country.

**JOB CREATION AND CAPACITY BUILDING**

The MEs provide employment to 300 young entrepreneurs (mostly men) as well as other local residents either as permanent or temporary employees. To date, the ME program has generated about 1,000 permanent jobs and between 3,000-4,000 temporary positions. The ME program allows for capacity building for the young entrepreneurs to realize their potential for better lives. The extensive training provided during the program allows these young entrepreneurs to develop and strengthen important skills necessary to the success of their venture.

**ENVIRONMENTAL RESULTS**

By promoting renewable energies, MEs are able to lower the use of fossil fuels such as kerosene which is mainly used in rural areas for lighting. Fossil fuels are known for their carbon emissions. Thus, using photovoltaic systems will reduce the amount of CO₂ emissions. According to a study made by the FFEM in 2005, 16,000 photovoltaic installations will result in savings of 32,000 tonnes of CO₂ over 10 years compared to traditional energy sources. Rural populations also depend heavily on wood for space heating, cooking and water heating which leads to local ecosystem degradation. MEs are promoting alternative energy sources that can substitute the use of wood and thus protect forests and the local ecosystem. Additionally, by relying less on kerosene and wood as fuel for cooking, heating and lighting indoor air quality is improved leading to better health conditions.

**Growth Strategy and Future Outlook**

Despite the modest results achieved by the program and the challenges faced in its execution, CDER is determined to keep the project going and scale it up beyond the six regions. As the partnership with UNDP approaches its end by 2010, CDER is trying to ensure the continuation of the program by passing the torch to the respective provinces and regions to manage the process. CDER representatives are convinced that with the current situation, there is potential for 2,000-4,000 MEs in both rural and urban areas. "MEs can be viewed as the interface between government agencies that provide certain services and the end users. They can play the role of agents of change. They can facilitate government services penetrations in rural areas and convince the locals to adopt them” said Mr. Berdai. In fact, CDER is considering expanding the ME’s services to include hydraulic services. ONEP, the national office of drinking water, is considering using solar energy to pump water from wells in order
to provide the remote rural villages with drinking water. MEs present a perfect alternative for ONEP to have access to those areas.

Building partnerships and good relations between the various partners is a fundamental pillar of this program. Each partner plays a vital role in the successful execution and implementation of the program. Continuous training and providing assistance along the way will be important to keep the entrepreneurs motivated and interested in the program.

Government support is also crucial in the scaling up of this program. Guaranteeing 85% of the loans for instance gives credibility to the program and encourages banks to give loans to ME project holders. Lowering taxes and importation tariffs help in the development of the renewable energy sector. Providing incentives to foreign investors can help bring in new technologies and know-how in this young and promising sector in Morocco.

The ME program is a great micro-enterprise model that other developing countries can adopt to improve the lives of poor people in rural areas. The ME program is a business model that has the potential to increase access to energy in rural areas by using renewable energy sources.
References

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The case was completed in February 2010 and released in 2011.

The information presented in this case study has been reviewed by the company to ensure its accuracy. The views expressed in the case study are the ones of the author and do not necessarily reflect those of the UN, UNDP or their Member States.

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