

Options for Rural Sustainable Development:
An Examination of Solar Energy in Morocco

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Abstract

This Independent Study Project is about on the current situation of energy in Morocco, especially in terms of the electrification of rural villages, as a means of understanding the potential of the country for developing renewable energy methods. It examines major energy companies and renewable energy organizations, as well as the experiences of solar energy technicians and rural development associations in their efforts to bring electricity to rural Moroccan villages. It also focuses on case studies of a few remote towns and the problems they face as they attempt to bring electricity to their homes.

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Introduction

Every now and then I will drive by one of the houses in America. One of those stately and large suburban homes which are quite like all the others on the block, except for one unexpected quality: the tremendous solar panels laid out on the roof, gleaming audaciously in the sunlight. It has been hard to ignore lately the increasing attention to the world's energy crisis and the quest for sources of alternative energy; it seems like everywhere I turn these days I am confronted with suggestions for 'reducing my carbon footprint' and drastic premonitions about global warming. Still, using a renewable source like solar power for electricity in America is rare. Energy from the electrical company is so readily available, such an established institution, that it is taken as a given. People hardly ever give thought to the other ways in which electricity can be obtained. Moreover, solar panels are expensive and difficult to install. So when I do come across such a house, I can not help but imagine its owners to be intelligent and daring in their choices; their devotion to reducing carbon emissions and helping to solve the energy crisis seems downright heroic.

It was with this romanticized idea of solar energy and sustainable development that I came to Morocco. I thought of alternative energy practices as radical and virtuous, and involving devotion and sacrifice in order to be implemented. At first, the solar panels that I saw in Morocco gave me that same feeling; I was impressed and happy to see them in use. Then, as I traveled more around the country, I began to realize how ubiquitous the panels really were. In fact, it was hard to escape them. Climbing to the terrace of my hotel in Essaouira for an orange juice, I was confronted with a panorama of rooftops, each with their own solar panel leaning expertly towards the sunlight. Traveling miles down a dirt road to a tiny rural village, I saw each mud and brick house boasting its own small panel. Solar energy in Morocco was not an

exception like in most of America, only practiced by those most enthusiastic to make a change, but instead simply a practicality. Solar panels in Morocco are a realistic and sensible way to bring energy to rural homes, and also help institutions to cut their rising energy costs.

This fascinated me. I thought that the way Morocco employs solar energy as an alternative resource could be a prototype for the rest of the world as it scrambles to deal with an impending energy crisis. I considered the amazing potential of the country to refine and improve the concept of a national alternative energy infrastructure which could then be applied in other countries as well. Solar panels in America could cease to be a rarity, and instead be as familiar as a front door or a driveway. These grand visions propelled me to focus my Independent Research Project on solar energy in Morocco.

Goals

My aim in this project has been both broad and more focused. I tried to create for myself a wide base of understanding of the subject, and then spend time studying in-depth specific cases of alternative energy development. To understand solar energy in Morocco I needed to establish a comprehension of the current energy situation in Morocco, involving both renewable and non-renewable sources of energy. I set out to research the structure and ambitions of l'Office National de l'Electricité (ONE), the company which singlehandedly provides most of the energy for Morocco. I also made arrangements to communicate with an expert at the Centre de Développement des Energies Renouvelables (CDER), in order to comprehend the alternatives to energy coming from the ONE and establish a background in the climate of sustainable development in Morocco today.

After this I planned to turn my attentions to rural development projects involving solar energy. These projects are widespread in Morocco, and a close examination of them would truly help illuminate the direction that solar energy is going in the country. I chose the Tichka Association located in Ouarzazate, an association devoted to the rural development of the region, as a specific case study, and planned to spend a week there interviewing and shadowing the founder of the association and solar energy technicians as they conducted their work repairing and installing solar panels in rural villages. From this field work I hoped to get a better sense of how such rural development projects are established and run. I wanted to specifically look at the demand for them and the amount of funding, both from home and abroad, that is available for them.

As I began researching and understanding better the situation in Morocco, I came across a multitude of intriguing questions, debates, and difficulties involving solar energy in Morocco. The scope of my project altered slightly to include some of these new concepts because I found them extremely pertinent in satisfying the original goals of my project. Firstly, I found myself questioning the benefits of electrifying villages. I started to see that having televisions can alter very much the mindset and livelihood of a village population, and wondered if it was always a good thing. I tried to obtain different points of view on the matter to include my research. Another thing I discovered was that ideas of sustainability and alternative energy are not stressed in importance as much as development in general. Sometimes it just happens to be that solar panels are the easiest way to electrify a village that is too far out of the way for the ONE to reach. The rural villages need and want electricity; to them it does not matter very much whether or not it is renewable. This got me thinking about environmental education and the need for awareness regarding sustainable practices, another concept I tried to include in my studies.

Methods and Complications

The information that I have gathered has come from many different sources. I have used the internet, specifically the official websites of a few major companies in Morocco involved in energy development. I have also gathered information through e-mail correspondences with certain experts in the field, sending them written interview questions and receiving their written responses. I did also conduct face-to-face interviews and had less formal conversations pertinent to my research with those knowledgeable about the subject. I never used an audio recorder for these meetings and therefore any of the information I use in this paper that comes from those sources is paraphrased; it is from my memory or from notes that I have jotted down and is most likely not an exact replica of the conversation that occurred. All other information in this project is a result of my own observation as I traveled around Morocco, whether I was watching solar panels being installed, walking through the streets of a city, or drinking tea with a grandmother in a small village.

There were no major complications or setbacks during the span of my research, only small glitches and an occasional slight change in direction. The biggest problem occurred while I was shadowing the solar technicians from the Tichka Association. They travel to rural villages on a daily basis to do repair work and installations for solar energy panels and water pumping systems. This was most definitely a man's work, and as I was the only woman around at all, I was not really allowed to participate in the actual processes. This did not bother me too much, however, for besides not knowing how to install solar panels anyway, I also absorbed an immense amount just from observation. I was allowed to sit, talk, and eat with just the men every day. Occasionally on a long day I was offered the option of going to be with the women for a

while. I would sit, weave, and attempt to communicate with the amazing women of the village for a few hours at a time. While they do not seem to be directly related to a research project on solar energy, I believe these hours were invaluable as a way to know the people that will be utilizing and having their lives changed by the systems that were being put in place in their town.

Ideas from a Private Solar Energy Technician

At the very beginning of the project period I set off to Marrakesh, hoping to eventually get in touch with an elusive member of the CDER so that I could talk to him about the company (of which I knew almost nothing except the name) and generally about the current energy situation in the country. I was just leaving an internet café after another unsuccessful attempt at communication with my sought-after interviewee, when I started conversation with another man who had just left the café as well. When I told him about my project, he mentioned that he happened to install solar panels for a living. He pulled out his business card, which read: Mohammed Daamti, Maison Energie, Agrée: CDER. He agreed to go with me to tea.

I thought that Mr. Daamti's insight and point of view would be a welcome addition to my research, an expert in the field who, as an entrepreneur, is not obliged to speak in support of any government organization or company he may work for. He got a masters degree in Ecology and Environment and then an engineering degree in a university in Casablanca. After, he took a two-year training course with the CDER focused on renewable energy technologies to be certified in the field. His expertise is the technical assessment of homes and businesses who are interested in using solar energy, and is now a member of the newly created Association Marocaine de l'Environnement et Développement des Energies Renouvelables (AMEDER). Up on the high terrace of a café overlooking the rooftops of Marrakesh, Mr. Daamti began my education of solar energy in

Morocco, supplementing his words with numerous pamphlets, work contracts, and diagrams of photovoltaic equipment that he pulled out of his bulky, hectic briefcase.

First we discussed the general energy situation in Morocco. Mr. Daamti told me that energy is a problem in Morocco because the country does not have any petrol in it as a resource, and therefore must import it all from abroad. This is costly and causes Morocco to be seriously dependent on other countries for the survival of its economy. Most of Morocco's petrol is imported from Spain, and its debt to its European neighbor is therefore growing every day. It was Mr. Daamti who first told me about l'Office National de l'Electricité (ONE), the company which buys the petrol from abroad and sells it to the Moroccan population. The ONE is working hard to bring energy to all of Morocco, even to the remotest villages, spreading its electrical towers and cords as far as it can reach. While this attempt can be seen as beneficial for the development of the countryside, Mr. Daamti noted that it is also using up the limited energy reserves of the country and is unsustainable in the long run as the world faces a severe energy crisis. Moreover, the ONE is most likely encouraged to spread its services more for profit making than for the good of the rural village inhabitant, who spends a good deal of his monthly income to have the electricity offered.

However, Morocco has incredible prospects for solving these problems. Mr. Daamti told me that the geography of Morocco is ideal for alternative forms of energy. With its vast expanses of desert, it boasts over 3,000 solar hours per year. Its long Atlantic coastline and its many mountain peaks are wonderful spots for harnessing wind energy. The good news is that this potential is starting to be realized. Just a few weeks ago King Mohammed VI broke the ground for a very large solar energy plant, just outside of Oujda. Also, Mr. Daamti told me the names of Total Energy, Temasol, and Isofoton, the three major companies out of many who are

bringing solar energy panels to rural Morocco. They offer what are called ‘photovoltaic kits’, which include any combination and amount of lights, television, and refrigerator that a rural family wants and can afford.

I was quite delighted to hear about the amount of motivation in Morocco towards alternative energy. But Mr. Daamti told me that the country still has a long way to go. While putting solar panels on top of every rural home seems an obvious solution to the problem of bringing electricity to rural villages, as Mr. Daamti said, “they [the Moroccans] forget solar energy”. This is due not only to the influence of propaganda from the ONE trying to sell their more expensive and less environmentally-friendly product, but also to past problems that Moroccans have had with solar energy. Mr. Daamti told me that in the past, when solar energy technology was just beginning to be introduced to the country, the panels were too expensive to be purchased brand-new, so families would buy old, used, and unreliable panels. Then they paid money to inexperienced technicians who installed them poorly and did not look after them properly. Their large investment in solar energy often ended up being a waste, and in many areas the panels still have a very poor reputation, even though the technology has been perfected considerably in the past few years. Wary Moroccans, who care very much that the investment of their hard-earned money goes to good use, choose to have their houses connected to what they consider to be the more reliable services of the ONE. A lot of hard work is necessary to educate and create awareness in Morocco about the dependability and the advantages of modern solar energy technology; even more hard work is necessary to then actually bring the energy to the rural villages that need it.

I also talked with Mr. Daamti about his past, current, and future projects in order to get a sense of what a solar energy technician in Morocco does on a daily basis. He had quite a range of

endeavors to tell me about. After his training course with the CDER, he worked helping install the photovoltaic kits purchased by rural families. He also spent some time going around to small villages as part of an education program. He helped explain to the families of the village their options regarding electricity in their households and in their schools, and give them a good understanding of how solar energy panels would work for them. Currently, he is attempting to start his own private business, and goes around to houses and companies who are interested in solar energy to assess their buildings and see what kinds of solar technology would work best for their needs. Just before I met with him he was talking with a French company who was based in Morocco and was interested in switching the energy that they used in their factory from fuel to solar. Mr. Daamti also introduced me to a new kind of solar technology which I was not previously aware of; using the sun to heat water. He showed me a few diagrams of these solar water heaters, which he called thermosiphon. They were rooftop structures that held water in little tubes, letting the hot water rise to the top and using solar energy as a pump to bring it to the household plumbing. In the pamphlet I was looking at, for a German company called Sunsystem, a thermosiphon that heats 300L of water a day costs 21,899 dirham. From looking at these structures I started to realize the potential that solar energy has to provide for development in this country in an affordable and sustainable way.

Mr. Daamti also owns an auberge in the mountain town of Imilchil, and its electricity comes from solar energy. He is looking to put a windmill on the top of the mountain there as well, to harness some energy from the frequent windy days in the town. He plans to start a cooperative there which produces apple products sustainably, and bring tourists as part of a program of responsible tourism in Morocco. I mention these future plans of his just to show that there is in Morocco a movement of intellectuals who are truly dedicated to bringing about

change in their country, and that solar energy is in the front of the mindset of these people. Mr. Daamti was extremely helpful in introducing to me the current mood regarding energy in Morocco, and from the basic information he gave me, I had more of a sense of the directions I needed to go to research for further understanding.

The ONE and its side program PERG

I decided that getting a better understanding of the ONE and how it works was an important starting point on my way to becoming an expert about energy in Morocco. I could not get in touch with a representative of the company to talk with personally, but I found that the ONE has a very extensive and informative website (with, thankfully, an English version) about the services it provides for Morocco. I did keep in mind that a company's own website will make sure to promote their operations in the best light possible. While I realize that the eloquent and promising words I read on the website might not be an exact reflection of reality, they nonetheless shed a lot of light on the ONE's role in Morocco.

The ONE introduces itself on its website as “the prime operator in Morocco’s electricity supply sector” (“ONE”). Created in 1963, it boasts 9000 employees and 3.5 million customers throughout the country, with its mission being “to meet the electricity requirements of Morocco in the best possible conditions of cost and service quality” by generating and distributing energy in all forms, mainly thermal (not renewable) and also hydraulic, wind, and solar (renewable) (“ONE”). One thing that was stressed on the website’s introduction page was the ONE’s major role in boosting the economic development of Morocco. It was mentioned that economic growth in the country has caused a significant increase in demand for electricity (growing about 8% a year). This has caused an increase in investment in the company, leading to

the construction of new energy plants and the importation of new technologies. The ONE has recognized this success and writes that it has “the ambition of remaining the top national operator, a driving force of the national economy” (“ONE”).

The ONE is clever enough to know that remaining on the “top” these days requires partaking in the popular movement of protecting the environment. Therefore they stress in their website their true commitment to respecting the environment by various programs of ecological development and protection, environmental impact studies, and making sure to comply with worldwide environmental standards when starting new development projects or upgrading existing ones. I also noticed that they are involved in many projects involving the development of renewable forms of energy. One of their biggest, the Global Rural Electrification Program (PERG, for its French name), is focused on bringing energy to the Moroccan countryside, only partially through solar power generation. Nonetheless, any dedication to developing solar energy is beneficial as a prototype for worldwide development projects.

There have been attempts by ONE in the past to supply electricity to rural parts of Morocco. In 1978 it established the National Rural Electrification Program (PNER), which was financed by local authorities and the government. The ONE also financed its own electrification projects. However, the surface of the issue was barely scratched, since the electrification started with larger urban areas and worked outwards. Many rural areas remained without electricity. Therefore the ONE felt it necessary to establish PERG in August of 1996, with the aim of giving rural Morocco access to electricity by the year 2010. This program is more about bringing electricity to homes in remote locations in the easiest, most cost effective way possible, and creating a larger ONE customer base, than it is about protecting the environment. However, it is important to the villages to have electricity, and the ONE is aiding them in this process. The rate

of rural electrification in Morocco rose from 18% in 1995 to 88% by late 2006, partially from the actions of PERG (“ONE”).

Looking closely at the programs goals, I found that of all the homes that they wanted to bring electricity to, 91% of them would be connected to the ONE network, and only 9% of them would be brought photovoltaic kits. Looking at a table of objectives, I saw that PERG wanted to bring, by 2007, network electricity to 612,000 households, and solar energy to 93,000 households. This ratio was determined by analysing the costs and benefits of bringing electricity to these homes. 91% of the customers live in areas where it is reasonable for the ONE to connect them to their network, and will therefore pay money to the ONE to help contribute to the dwindling energy resources of the world. To get one household connected to the network, local authorities pay 2085 DH per household, the household pays 2500 DH, and the ONE pays the remaining 55% of the initial costs (“ONE”). The remaining 9% of households (around 150,000) are too remote to make it worth it financially to connect them to the network, and therefore the ONE will sell them photovoltaic kits. Any family that is interested in one of these kits can choose between one with a few lights and an electrical socket, got a down payment of 900 DH and then 65 DH a month, or one with a refrigerator which costs 4000 DH and then 150 DH a month (“ONE”).

Understanding more about the ONE and its program PERG, I began to formulate a few conflicting ideas and questions that I wanted to look into further. I could see that bringing electricity to rural villages is an important endeavour, and it is therefore noble of the ONE to dedicate itself to this purpose. However, I wondered how much of its ambition was fed simply by gaining customers and making money, as Mr. Daamti has mentioned. Could a larger percentage of the homes have been brought photovoltaic kits instead of been connected to the grid, with the

same result of electricity, for a lower cost to the people and to the environment as well? Was it more important to bring electricity to the rural villages as fast as possible, instead of using methods that may be more sustainable in the long run?

The CDER

In an effort to answer some of these questions, I knew I needed to look at the situation from a different point of view, one that is derived from a devotion to sustainable development as opposed to profit-making energy production. I turned to the CDER. Still waiting to hear back from the employee of the company who was willing to talk to me, I decided to look at its website for insight as well. On its introduction page it calls itself a “public operator charged with the development of renewable energy.” It also says that “a country geographically and climatically favorable like Morocco has to permit the development program of a diverse energy options and alternatives based on a large potential of renewable energies” (“CDER”). The CDER has taken on a major role in the development of renewable energies in Morocco, because it understands the increasing demand for energy in both the industrial and private sectors, and also the international demand for the protection of the environment. It therefore plays extremely important part in renewable energy development: encouraging investment in renewable energy. It does this both by finding finances and by creating a strict set of standards for renewable energy projects to adhere to.

The CDER website says that over 95% of Morocco’s energy is imported from abroad, and that it is crucial that the country reduce its energy dependence with renewable energies (“CDER”). It therefore makes it its task to encourage both national and foreign investors to put money into renewable energy development. It acts as the foremost quality controller of these

projects, thoroughly assessing them to be certain that they pose no risks and then guaranteeing the financier that their investment will be of the highest quality. In this way it becomes the important coordinator between those who develop the renewable energy programs and those who finance them. They even set up the program called Fonds de Garantie des Efficacités et Energies Renouvelables (FOGEER), which formally guarantees that investments will be worth it

The CDER emphasizes on their website that they plan to support and enhance the renewable energy market, making sure to incorporate all aspects of politics, economy, and environment, in order to transform energy usage in Morocco in the most reliable way. They want to make renewable energy available and affordable for everyone. One of their biggest programs is the national promotion of solar water heaters, called PROMASOL. PROMASOL has been set up to promote the development of the solar energy market, particularly in terms of thermal solar energy. The CDER want to involve all economic sectors in this type of energy; industries, hotels, and homes. The CDER also helps promote renewable energy programs by helping with technical knowledge, maintenance and repair of products, and a thorough follow up and evaluation of all projects. It also makes sure to encourage investors by giving them ideas and making absolutely certain that their projects carry no risks, and are first and foremost dedicated to renewable energy and energy efficacy.

The proclamations on the CDER website pleased me; after the stories Mr. Daamti told me about faulty solar panels being installed in people's homes, I understood the need for an organization that officially holds people accountable. The CDER is choosing a very responsible and intelligent route with which to develop renewable energy technologies. I was also happy to continually hear its name mentioned as being involved with individual projects that I was

researching.

Temasol

I was intrigued by the solar energy companies of Morocco that Mr. Daamti had mentioned: Total Energy, Temasol, and Isofoton. I knew that the Tichka Association I was going to be working with in a few days was affiliated with Isofoton, and I would get a good idea of it later, so I tried to research the other two instead. Online I found a well-written in-depth case study of the work that Temasol is doing in Morocco. It was extremely helpful in giving me detailed information and statistics on the way rural electrification is done in Morocco.

As it turns out, the program of Temasol was developed by the ONE itself. It is in collaboration with a company called Electricité de France (EDF). Its main goal is to bring electricity to the homes which are too remote or separated from the nearest towns to be financially and structurally able to be connected to the ONE's grid. As it was put in the case study, "the ONE decided to use solar power, in addition to more traditional technologies, in order to advance the geographical limits of electrification and to enable populations living in areas of scattered habitat to have access to electricity" ("Electrifying"). It created this program in order to collaborate with solar power operator, Temasol, which has expertise in the area of rural solar energy development. The partnership works as follows: the ONE oversees and specifies the organization of the project, deciding which areas and households are in need of electricity and provides most of the funding, while Temasol acts as an operating service, doing everything from marketing in a booth in the weekly souk to installing and maintaining equipment to collecting the monthly fees. Temasol has 83 employees and 7 different branch offices, and they make sure to thoroughly train their employees in sales and installation techniques ("Electrifying").

Their plan (as of the 2005 case study) is to not only install solar panels in villages but also establish a locally-run company whose purpose is to maintain the services of electricity in the long run, thus creating jobs in the area. Each household which opts to pay for Temasol's service receives a solar panel system which generates electricity using a battery and controller. The battery stores energy so that lights, television, and electrical sockets can be used all day and night, whenever needed, even if the weather is not sunny. Temasol is the one who installs the equipment and is responsible for maintaining it for up to 10 years. The goal of what they called Phase I of the operation was to reach over 53,000 customers in the northern provinces of Morocco; as of April 2005 they had installed systems in over 12,000 homes ("Electrifying").

What is most interesting to me is the way Temasol operates financially. Each household that wants solar panels pays an initial fee for installation and then also pays a flat monthly rate for service; the fees varying depending on how much electricity they use. For example, to have 4 lamps and one 12 V socket it costs 700 Dirham to install and 65 Dirham a month, to have 8 lamps and one 12 V socket, it costs 3,100 Dirham to install and 129 Dirham a month ("Electrifying"). The fees were determined after studying the amount of money the average rural household spends on gas, candles, and other lighting equipment which would no longer be necessary once they have solar panels. In fact, they do not reflect the actual cost of the installation and service, which is much higher. The fees are instead subsidized by the ONE, who provides a grant for each installation covering 66% of the cost, and Temasol, who contributes 24% of the financing for installation. The case study proclaims that this is simply, "in order to provide equal energy access opportunities to the Moroccan population" ("Electrifying"). Temasol also has received what is called an 'equipment grant' of US \$28.5 million, from the

ONE and other grants from French environmental companies, and benefits from the monthly service fees paid by its customers, in order to cover costs and make a profit.

The Tichka Association

It was with this base of knowledge about energy in Morocco from my research on ONE, CDER, and Temasol, and with my conversations with Mr. Daamti, that I set off to Ouarzazate to spend a week with the Tichka Association, an association devoted to rural development projects in the regions of Ouarzazate and Zagora. My only previous introduction to the association was from a document which provides an overview of the structure of the association and the programs it has. It was created in 1993 and has only 10 salaried members (and around 20 volunteers). Its objective is stated as “to contribute to the socio-economic development of the region” and among a list of missions is cited “to mobilize all human and material forces in view of a locally organized and durable development” (“Association”). The Tichka Association works with an incredible array of partners, ranging from local village collectives to the Institute of Solar Energy in Madrid to the Ambassador of Japan. Its range of projects is no less impressive; they have created clean water systems, set up hygiene and disease awareness programs, built schools and dormitories, electrified rural villages, and helped rural women develop trades for income generation.

I planned on discovering as much as I could about how the association is run and its opinions and attitudes towards energy in Morocco. To do this, I spent four days doing rural electrification fieldwork, shadowing a solar energy technician employed by Isofoton and associated with Tichka, Youssef Lbacha, as he went from village to village in the area installing

and repairing solar energy equipment. Then I interviewed the founder of the association, Mohamed Aandam, and asked him questions about the work that I had experienced.

I am going to detail as much as possible the situations of the rural villages that I visited with Youssef, including the observations that I made while I was there, in order to provide a clear picture of the different kinds of circumstances that require solar energy work and the problems that solar energy development faces in Morocco.

Tidzi

On my first day with Youssef we went to Tidzi, a small village in the rural community (a designation which can include many small villages) of Tidli in the province of Ouarzazate. Early in the morning I climbed into his tiny white truck with another technician and a professor at a local school who was a resident of Tidzi and also the head of the town's own development association. Called the Association de Developpment Tidzi (ADD), it works in cooperation with the Tichka Association to aid in the development of the village. We set off on the windy highway heading outside of Ouarzazate, past mountains and desert plains, through a black, dusty magnesium mine, and, after about an hour, off the paved highway onto a rocky, rough road. Rumbling down this road I could only wonder where Tidzi could possibly be located and how it came to pass that anyone could establish a town in such a barren, unforgiving landscape. Then we turned a sharp corner and I saw that we were overlooking a river valley, with green trees and fields far below, and the tiny town of Tidzi perched on a hill. The presence of the river helped me understand how Tidzi came to be built there, but I could also see that its remoteness would make it very difficult to get connected to the ONE network.

We parked at the headquarters of the ADD, a two room building dominated by the 85 solar panels perched on its flat rooftop. I had time to meet a few men who were painting and fixing up the inside of the building before I went off to have a tour of the town with the head of the association. On our stroll around the beautiful village I had a chance to talk to him about the history of the town's recent development and also get a picture of life in the village. I gathered that the town has 600 residents in the summer and only 200 in the winter, when people go work elsewhere. They come back to work the harvest, which includes almonds, honey, figs, and other vegetables. The river that runs through the bottom of the valley is essential to this harvest and walking along its bank I could see how green and lush it makes the agriculture. Almost all of the men in Tidzi who stay throughout the year work in the nearby magnesium mines, which is why the town had an empty feel during the day.

Up until 1996 the town used two wells down by the river to get its water. Then in 1996 the wells became contaminated with diphtheria, causing an outbreak of sickness in the town and the beginnings of a movement to develop a better system for water. In 2002 the ADD was founded, and in 2004 a solar-energy powered water pump was installed in the village. The 85 solar panels on top of the association building power the pump, located in a small structure by the riverside (right next to the old well, which has been rendered useless and is now covered). The sun powers the pump, which sends water up the hillside of the valley to a tank perched above the town which stores the water. The stored water then runs downhill to the houses of the village, which now have plumbing and running water. The most important aspect of this pump is that it also powers a mechanism called a Dosatron, which adds chlorine to the water at regular intervals, in order to make it safe for drinking and prevent any more devastating outbreaks of

disease. The head of the association says that there has not been a problem with the pump in the four years that it has been working.

The realization of this pump came from a collaboration of sources. The majority of the money was supplied by a French association, and students from the Polytechnic University of Madrid came and installed it. Inside the building which houses the pump hang a French, Moroccan, and Spanish flag. When the Spanish university students installed they system, they taught the town how to run it and maintain it. The town also keeps a daily log of the pump's functioning, which they send to the University. The University uses the information in its studies as an experiment in rural development, so, as the head of the association said, everybody wins.

The next step for Tidzi, and the reason that I was there with Youssef that day, was solar energy powered electrification of the village. Too remote to be connected to the ONE network, Tidzi has been using somewhat archaic methods in order to have electricity. They pay lots of money for gasoline, which is difficult to transport across the rugged terrain back to their village. With all the work it takes and all the conflicts it causes, using the gasoline they can only generate around 3 hours of electricity a day per household, which is not nearly enough to satisfy their needs. So the ADD collaborated with the Tichka Association and Isofoton, and is set to install 85 more solar panels on top of the association building, connected to a large set of batteries, bringing around 18 hours a day of electricity to every household.

Youssef told me they had about a month of hard work before the town would be prepared for the electricity. Since most of the men in the town are away in the mines all day, the bulk of the work is done by Youssef, the other Isofoton technician, and a handful of men in the village. On Sundays, when the mine is closed and there are lots of men in the village, they all chip in to get as much work done as possible to speed along the process of electrification. When the work

is almost complete, a few members of Isofoton from Spain will come, on a solidarity trip, in order to help as well. In the two days that I was there (I went back with Youssef one other day), they had set up four rows of large batteries and two large structures that looked a bit like refrigerators, but when their doors were open they proved to be completely full of complicated looking wires and machinery. One was called the “rectificador-chopper” and the other the “ondulador oasis,” Spanish names because Isofoton, which supplies the equipment, is a Spanish company. They also had begun to string up thick, black, electrical wires running from the association building to one of the nearby houses, as children from village sat watching. Youssef worked hard all day, and both times we stayed in Tidzi until after dark.

I wondered how much the panels cost the village, and when I asked Youssef, I got an interesting response which added a whole new set of questions to my research project. He informed me that the panels were fairly cheap, because they were not new. Instead, they were old panels sold to Tidzi by a neighboring village which no longer needed them, as they were now connected to the ONE network. I was slightly shocked, because I did not understand why a village which already had an established system of electricity with solar panels, from a source of energy that is renewable and cheap, would then sell that system for a non-sustainable one. When I asked, Youssef told me simply that the network had “mas fuerza (more strength)”. He said that Tidzi would probably also be connected to the network one day, and would then sell its solar panels to another village. This news was upsetting for my ideal vision of rural development where everything is sustainable and environmentally friendly. Solar panels that worked just fine were being taken down and replaced by regular electricity, not the other way around. But I began to think about which was truly more important, bettering the lives of the people in the village or reducing the earth’s carbon dioxide levels? As I sat weaving and laughing with women in the

village or munching on almonds with a few of the men as a break from their hard work, I started to see development from a different angle. Why shouldn't these people have the best that there is, regardless of its environmental impact? Is it possible that sustainable practices and alternative energy technology could one day become the best, so these choices do not have to be made?

Ifladen, Tasgua, and Imi n Site

On my second day with Youssef we stayed in the province of Ouarzazate but went off in a different direction, first to the town of Ifladen and then quickly to its neighbor Tasgua. Both are in the rural community of Toundoute. The situations of Ifladen and Tasgua gave me an idea of some of the problems faced by rural villages as they strive to bring electricity to their homes, as well as an idea of the range of work that Youssef does in his job.

Ifladen had a similar water pumping system to the one in Tidzi. It also had a Dosatron sending chlorine into the water to keep it safe for drinking, but the mechanism was broken and needed replacing. I spent the morning in the building that housed the pump with Youssef, the other Isoton technician, and one older man from the village. Armed with the new part and a full tool-box, the men successful replaced the Dosatron, and in the process noticed a few more complications with the pumping system. The water was not running through the pipes properly and there was a small leak at one end, which was covered with tape. Maintenance and repair is in the contract that the village signs in order to receive the system, so it was necessary to fix the matter. After some time, some more tape, and some trial and error, the system was back up to standards, and we could go have tea in the mans home.

Tasgua was just a short walk away from Ifladen. The village is not a part of the Tichka Associations development projects. It had a few very old looking solar panels, which were

installed and financed by the Canadian Agency of International Development, but were no longer in functioning condition. Tasgua asked the Tichka Association to visit and assess the area, since they wanted to put in a new set of solar panels on the roof of their Mosque. Youssef and I walked around and took some pictures of the site, and also took a look at the old panels. From this I got to see the preliminary stages of a rural village which has taken it upon itself to improve its condition, collaboratively making a decision to pay for solar panels and then requesting help from an association in the area in order to realize the project.

On my third day with Youssef we left earlier than usually to take a 3 hour drive south to the Province of Zagora to visit Imi n Site in the rural community of Tazarine. On the long drive I had time to contemplate the extensiveness of the area that Youssef covers as a technician. The provinces of Ouarzazate and Zagora cover a lot of space, and he drives in every direction in order to reach the villages which need his expertise. He told me that he has not had one free day in the past twenty, because there is so much work to be done. This gave me a sense of the incredible demand for solar energy in the region, to bring electricity and running water to the multitude of villages. I could see the amazing potential for job creation and the establishment of a base of more solar energy experts as time goes on.

Imi n Site already had 30 solar panels in their town to help with water and electricity, installed with the aid of the Tichka Association. However, unknown thieves had come to the village in the middle of the night and had stolen 10 of the panels, in order to sell them for their own profit. We brought 10 new panels to install and connect to the system, allowing it to work properly again. Under the contract that Imi n Site had signed with the Tichka Association previously, the village was responsible for keeping watch over its own solar panels, and therefore had to pay full price install the new ones. They obviously thought that having the system intact

again was worth the price, and resolved to have a night watchman guard over the new ones. Sitting on the rooftop of the association building, watching Youssef connect wires from the new panels to the old ones, I talked with a man from the village about the robbers. He told me that Allah would be disappointed in them; I agree. The panels were helping to bring clean water to the village and provide lighting at night and in the schools. Stealing them meant creating harm and danger for innocent children, for parents who want nothing more than to protect and take care of their families. Unfortunately, Imi n Site is not the only village who has had this problem. Robbers are another serious obstacle to the progress of solar energy development in the area; stories like the one from Imi n Site discourage other towns from investing their money in the technology, if they think it will easily be taken away.

We had tajine in the house of the man that I had been speaking with, and in his salon I watched as he signed another contract with Tichka, brought to him by Youssef. We were accompanied by a few other men from the village, who all came to eat and watch the paperwork. I was reminded of how collaborative the process of development in these villages is. It requires a pooling of resources and a collective decision by all the families to move ahead. I could see the dedication that these men had towards the improvement of life in their village, the pride they had in their homes, and the seriousness with which they looked at the matter. I realized the importance of the work Youssef, Isofoton, and the Tichka Association were doing; making the villages places where people desire to live, to raise families, and to take pride in.

Ideas from a Founder of a Development Association

Fresh from four whirlwind days with Youssef in all areas of the Ouarzazate and Zagora provinces, I had an abundance of questions and ideas in my head, ranging from specific inquiries

about the structure of the Tichka Association to general issues of the importance of solar energy in Morocco. I conducted an interview with Mohammed Aandam, the founder of the Tichka Association and the man who organized my experience in Ouarzazate. Having worked in all areas of the field for some time now, he was extremely helpful in answering and clarifying my thoughts.

First off, I wanted to hear from an expert's point of view why solar energy is important in Morocco. Mr. Aandam said that the price of petrol is extremely expensive. Moreover, Morocco is a big country where a large percentage of inhabitants live in rural areas where it is really expensive to bring electricity. As he put it, "every country needs to find solutions to respond to the necessity of life...it is for this reason that there are alternatives like solar energy". He also mentioned that solar energy is clean, and is very helpful for people who can not afford regular electricity.

I also was interested in knowing the structure of the association and the projects it is involved in, especially in terms of finance. This was because I had been noticing how solar energy in Morocco always seems to be tied to a foreign financier of some kind, whether it be a Canadian association or a Spanish university. It made me wonder how difficult it was to obtain the money for these development projects; if maybe the difficulties of obtaining the money were hindering the expansion and progress of solar energy technology in Morocco. Mr. Aandam agreed that associations, particularly new ones, do encounter many difficulties in obtaining sufficient funds for their projects, or if they do find funding, they do not have enough to cover salaries and other indirect costs to keep the association running.

The Tichka Association has been successful in obtaining funds, from a wide variety of different sources, including the Polytechnic University of Spain, the Foundation for Solar Energy

of Madrid, which works for development in cooperation with Isofoton, and also the Mohammed V Foundation for Solidarity in Morocco. The list is very long. As Mr. Aandam puts it, “to obtain money, it is necessary to prepare a project which responds to the philosophy and the vision of the financier. It is necessary to present arguments and objectives to convince your partner”. As long as an association is thoroughly organized, detailing exactly what they propose to do, how they are going to change the lives of the population, the impact, and of course, how much money you need, they should be able to obtain the money somehow. It seems as though the world has a lot of money for people who want to make a change, as long as they are thorough and steadfast in their desires. Even so, having to ask for resources from multiple organizations just to be able to finance one project must be a strenuous process.

I was also interested in the jobs created by the association and by solar energy in Morocco in general. Since the technology is fairly recent, I wondered if there were many trained Moroccan technicians like Youssef (who was the only one for a very large zone) or if foreign technicians were being employed instead. Like I was thinking before, I was intrigued by the idea that solar energy could really help create jobs and generate income in the country. Mr. Aandam told me that the association employs technicians both from Morocco and outside. He said that when they begin solar energy projects, they bring in experts from Spain, and the Moroccan technicians learn the trade from them, such as Youssef. The Moroccan technicians are then those who spend most of the time in the field; except when something very technically complicated occurs, and Isofoton technicians from the cities are called in. Mr. Aandam did say that the solar energy projects were creating an important amount of jobs in Morocco, citing the current need for more technicians as the demand for solar energy panels grows. He said that Isofoton in Morocco, working in collaboration with the program PERG, employs more than 80 full-time

Moroccan employees and only two Spanish employees. He also mentioned that people from the rural villages also often find indirect employment from the projects. For example, while the Tichka Association will bring a village solar panels and a pump, the people themselves need to provide man power, figure out the distribution of the water, install the pipes in their house, and figure out how to pay for the water.

When I asked him about villages who sell their solar panels when the ONE network arrives in their village, Mr. Aandam told me simply that when the network arrives, the people opt for it for their own personal electricity but keep solar energy to pump water, because it is cheaper that way. Mr. Aandam's responses were helpful in furthering my understanding of the way solar energy is being developed in Morocco.

Isofoton

Besides being the founder of the Tichka Association, Mr. Aandam is also the commercial director of the solar energy company Isofoton. The Tichka Association and Isofoton collaborate very often; together they have installed more than 22 solar powered water pumps in the Ouarzazate and Zagora provinces, a few of which I saw on my travels with Youssef. It is Isofoton's Foundation for Energy Solidarity that is supplying the solar panels and helping pay for the project in Tidzi. From talking to Mr. Aandam and from looking at Isofoton's website, I got a good glimpse of yet another solar energy operator in Morocco.

Isofoton is a Spanish company specializing in using the sun for electricity and water heating. It is not solely based in Morocco. In fact, Mr. Aandam informed me that it works in over 50 countries of the world, and is the foremost solar energy company in Spain, the second in Europe, and the sixth in the world. Their focus is to provide energy for rural areas which have

difficulty getting access to the conventional electrical network, but they do recognize that its importance as a clean energy resource; on their website they define (in bold) solar energy as “a source of renewable energy that does not damage the environment” (“Isfoton”). Isfoton also highlights on its website its dedication in all of the countries that it works with to train local technicians and create local service companies, in order to generate income for the countries inhabitants. Going to work with Youssef, who never traveled without his Isfoton hat on, I saw first hand the realization of this goal.

Isfoton focuses on making its products vary technologically reliable while also environmentally friendly. It has a wide range of products, all of which are involved with pumping or heating water. They write on their website, “faced with the challenge of improving the quality of life and integrating the most disadvantaged areas of economical and social development in developing countries, Isfoton is committed to make the Sun work for the benefit of mankind, by proposing Solar Energy as the only viable alternative in isolated rural areas” (“Isfoton”). To fulfil this commitment, Isfoton focuses on helping rural communities with public lighting, schools, water supply, and health centers, as well as providing individual homes with the ability to have lighting, television, and other appliances. They also cite the high level of reliability, long life, and minimum maintenance of solar energy systems. This makes me hopeful that if Isfoton continues to bring its advanced technology and high professionalism to morocco, maybe villages will stop switching to the ONE network and instead keep the reliable and environmentally friendly solar powered electrical systems that they already have.

Why Bring Electricity to Rural Villages?

The basic, initial question of this project and one that is very important to answer when considering solar energy in Morocco, is why is it necessary to bring electricity to rural villages at all? Moreover, is it a good thing, or would the villages in fact be better off without electricity? While this is a question for the beginning of the project, I have not addressed it until now because it is only at the end of the project that I feel that I have enough knowledge and information to answer it properly. The question has been in my head since I set out to do this research, and I am glad that I have waited until the end to organize my own thoughts and opinions on the matter because they have changed very much with my experiences.

My initial prejudices on the matter came during my week-long rural village stay in Feryat, outside of the town of Boujad. The family I stayed with had solar panels on their roof, which allowed them a few lights and a socket into which they plugged an ancient television. Long lazy afternoons were spent watching the television, even though my family could not understand the French or classical Arabic which was spoken in the majority of the programs. At that time I thought having the television there was not good. In general I think of television as an unproductive use of time, and I found it depressing when my lively home stay family would clam up to stare at talk shows. The programs also flaunted rich, extravagant livelihoods which I imagined caused consternation in my village family; why did they work so hard and not have the same things as the people on television? I got to thinking that maybe electricity was not such a good thing to bring to a village, maybe traditional ways of life were best kept intact.

My opinions have changed very much since then, owing mostly to the fact that I encountered the wonders that electricity can provide for a village besides television, the most essential being clean drinking water. I had not previously thought that solar energy could be

employed to provide so basic a necessity. Clean drinking water is absolutely essential, and having running water in ones home is such an improvement on the quality of life, that solar energy becomes absolutely sacred for this reason alone. On top of this, the lights that are brought to the homes by solar energy can be used at night to light ones path and avoid dangers, and also keep thieves away or monitor animals. Public lighting in the streets can help increase the amount of time giving to income generating activities, and lighting in the schools can allow students to stay up later studying. I also talked to a teacher in Tidzi who mentioned that with electricity it might be possible for the children to have computers at school, a skill that is essential to learn in this time. As for television, the families can watch the news and be aware of what is going on in the world, which can be especially important if they have family members who are working abroad. The television can also be a good source of entertainment and relaxation for people who have had a long day working.

The most useful thing that helped me answer this question was simply talking to and observing the people who lived in the towns that I visited. Whenever I asked, I got an emphatic yes to the question of whether or not they were happy about the solar energy in the villages. I could see from the hard work and the seriousness with which they approached the matter that they were dedicated to doing the best they could for their families. Bringing electricity to a village improves the quality of life of the people there, creating pride in their homes and therefore preserving an amazing community which may otherwise be deserted in search of a better place. If these reasons are not enough, it is important to also notice that it is impossible to deny human beings something that they want and can afford, simply because it is not clear to you what is best for them and what is not. Therefore I have concluded after the duration of my

research that solar energy is an indispensable technology for Morocco as it works to develop and better the lives of its citizens.

Conclusion

During my research project period I tried my best to get a full understanding of solar energy in Morocco, from the structure of the largest government programs set up to promote it to the opinions of it from individuals in tiny rural villages. I studied the ONE as the largest energy supplier in Morocco who is set on bringing electricity to rural villages, whether through connecting them to the network or bringing them solar energy. I studied the CDER as an organization devoted to the development of renewable energies as superior and reliable energy options. I studied the program Temasol, which is trying to bring photovoltaic kits to homes all across Morocco. I traveled to rural villages to learn from solar energy technicians as they install and maintain solar energy equipment. I talked to a solar energy engineer and to the founder of the Tichka Association which is dedicated to the development of rural villages in the area by bringing them electricity. I studied Isofoton, a global company with solar energy projects in Morocco I tried my best during all of this to keep my mind open and to ask as many questions as I could think of, in order to absorb and process as much information as possible.

While of course I am still no expert, I now have enough information to begin drawing some of my own conclusions about the meaning of solar energy in Morocco. What I have decided is that the continual development of solar energy in the country is important for two reasons. The first is that it is a renewable energy source which does not harm the environment. The country should take advantage of its incredible amount of sun in order to reduce its significant energy dependence on other countries, and in doing so help protect and heal the world

we live in today. The second reason is that, environmentally conscious or not, rural villages in the country need electricity. The quality of life in these areas needs to be improved to protect their history and prevent immigration to cities. Many of these towns can not feasibly be connected to the electrical network, and solar energy panels are the easiest and most efficient way to bring energy to the village. These two reasons are more than sufficient to convince me that it is essential that solar energy technology and development is continued in Morocco.

As for the direction of this development, I first propose thorough evaluations of the impact of electricity on rural village life in order to see which combinations and types of electricity work best to ameliorate life at a minimal cost. Once it is understood exactly how to do this, I propose a dedication to the advancement and perfection of technologies in order to provide the best, most reliable solar energy equipment for the villages. Then, maybe, they will not need to sell their panels and switch to the network when it arrives. I also propose awareness programs which set out to the villages to educate villages more thoroughly about their options regarding electricity and about the difference between renewable and non-renewable energy sources. Maybe then more and more people will use for solar energy because it is good for the world, not just because it is the only option available. I know all of this is feasible because I have witnessed firsthand in this project the commitment and enthusiasm that the citizens of this country have for continuously improving the life of everyone around them. I imagine that one day Morocco can be a model for sustainable development for the rest of the world.

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Appendix A: My email interview with Mr. Mohammed Aandam, conducted in Spanish. My questions are in bold, his responses are not.

Primero, quiero saber como escribir los nombres de los pueblos que hemos visto yo, Pepe, y Toufik. La primera dia fuimos a Tidzi, la segunda dia a Toundout (?) y Cassiga (?), y no me recuerdo el nombre del pueblo donde fuimos el tercero dia. Era el pueblo que tenia problemas con los ladrones; hemos instalado diez panelas nuevas porque los otras estaban robado. Sabes el nombre?

Nombre de los pueblos

1er dia : Pueblo TIDZI en la Commune Rurale (CR) TIDILI . Province de Ouarzazate

Segundo dia: Dos (2) pueblos: TASGUA y IFLADEN los dos en la CR de TOUNDOUTE province de Ouarzazate. El primer que es Tasgua no es de Tichka . Tiene algunos paneles antiguas réalisaban en el tema de proyectos financiados para la coperacion canadia (Agence Canadienne du Developpement International (ACDI). El secundo que es Ifladen es de Tichka y donde Youssef a cambiado la junta del sistema de tratamiento de agua “clorador”

Tercero dia: IMI N SITE en la CR de TAZARINE en la Provincia de Zagora donde vosotros han cambiado 10 paneles.

CR: Commune Rurale. En una CR puede haber muchos pueblos.

Porque es importante la energia solar en Marruecos?

Sabes, la energia de una manera global es importante para cada pais. El pricio del petrol es muy caro. Y cada pais debe encontrar soluciones para responder al necesito de la vida. Maruecos es un pais grande y donde el mundo Rural ocupada un gand pourcentage. Pueblos lejos, viviendas en las montanas y para llegar la luz a cada uno es muy caro. Es por este rason que hay alternativas como la energia solar, eoliene..... Por ejemplo para electrificar estos pueblos el governemiento marroqui concreta un programa que se llama PERG (Programme d’Electrification Rural Groupé). La Electrificacion se puede hacer con la RED nacional sobre todo por los pueblos donde hay un potencial importante or cerca de la Red y con un coste barato (menos de 30 000 DH/ vivienda) es decir que cuando el coste para dar electrification a cada casa es superior a 30 000 DH para cada vivienda, la ONE decida integrar la energia solar. Es por eso en el mismo programa PERG hay una formula que se llama PERG SOLAR. Cada familia que es interesante puede escojer entre 2 sistemas solar. Los dos son individual. Un sistema con potencia de 75 Wc. Con este se puede funcionar 4 luminarias (3 de 7w y 1 de 11w), una enchufe (prise de courant en frances) para funcionar un TV DVD radio or carcador del mobile. Con este sistema la gente paga 900 DH = 90 dollars una vez y despues pagan cada mes 65dh =6,5 Dollars durante 10 anos. Con este dinero los clientes benefican de un maintenimiento de 10 anos es decir que cada componente del sistema que no funciona se puede cambiar gratis (sin pagar nada). El otro sistema es de 200 Wc. Con este incluido una neveria (frigo) de una capacida de 160 litros. El pricio es diferente (4000 DH =400 dollars a pagar una vez y despues pagar 150 dh =15 dollars cada mes durante 10 anos). (Cuidado con cifras en Dirhams y en dollars). Para haber una idea muy clara sobre este programa y otros sujetos de la electrification (energia), te pide consultar el

site web de la ONE www.one.org.ma y del CDER (Centre de Developpement des Dnergies Renouvelables www.cder.org.ma . espero que hay una version en english.

Por final, la energia solar en maruecos es muy importante porque es clean, ayuda & la gente que no puede tener la luz por el problema del coste. Para aprovechar del sol y para contribuir a la produccion de la energia.

Es importante ver el site web de la ONE para haber mas informacion sobre un proyecto con la energia solar que se llama "Chourouk". Es importante!!!

Que otro tipo de energia hay en Marruecos? Que tipo de energia es de el ONE? De donde viene este energia y cuanto cuesta? Te pide consultar site web de la ONE hay una version en english.

Que son los impactos de electrification en los pueblos rurales en termos de cualidad de vida? Como cambian las vidas? Es siempre una cosa buena tener electricidad en los pueblos? Todas las familias de los pueblos quieren electricidad y quieren pagar?

La cualidad de vida de la poblacion esta mejorada. Cada uno tiene la luz en su casa 24h/24h y 7dias/7dias. Puduen ver la television y seguir la noticias cada dia, los nonos pueden hacer cursos de escuela durante la noche y este puede mejorar el nivel de cada uno. En el termo de seguridad y de salud, la gente puede, mover en su casa como lo que quiere sin dudas. En el termo economico, el precio es muy barato que lo que pagan antes. Por la gente que tiene la electrification de red national, puede utilizar otras aplicaciones como sacar (bombear) agua, puede tener la luz las calles publicas (actividad productivos de dinero), trabajo des madera (meunuiserie en frances), trabajo de iero (fer, forger en frances) Tu pudes imaginar todas las cosas que se puede hacer con la electricidad.. Todas las familias quieren la electricidad y pagan sin problema porque en todas casos pagan mucho antes (para comprar gas, candelas, baterias....)

Como empieza la association Tichka, y como es que tu tenia la idea a ayudar el desarrollo de la zona?

Hay que ver el documento adjunto en Frances.

De donde viene el dinero por este association? Era dificil obtener este dinero? Como se lo obtiene? Es una problema si todo el dinero viene de companias extranjeros?

Hay que ver el mismo documento adjunto en Frances.

Podemos decir que las associaiones en particular las nuevas, encuetran muchas dificultades para obtener dinero y subvenciones para realizar proyectos. Hay algunas asociaciones que encuentran dinero pero el "Bailleurs de fonds" pide a este asociacion de contribuir al proyecto con un purcentage (30% hasta 50% del coste global del proyecto) cosa que es dificil para este asociacion de encontrar otro partener. Otra parte, es dificil para las asociacion encontrar dinero de su funcionamiento (salario del personal, costes indirectos...)

Para obtener dinero, hay que preparar un proyecto que responde a la filosofía y a la visión del financiador. Hay que presentar los argumentos y objetivos para convencer (convaincre) su partener. “realizar un documento de propuesto del proyecto y clarificar las actividades que van hacer, el numero de la poblacion, que quiere cambiar en la vida de este poblacion, el impacto, el coste (cuanto dinero tu necesitas.....”

El caso de Tichka, el dinero viene de las campañas extranjeras como ONG española, universidad polytechnica de España, UE, Fundación Energía Solidaria Madrid (fundación que se encarga del desarrollo) es de Isofoton. Dinero de la AECI (agencia española de cooperación internacional) Fundación Mohammed V por la solidaridad en Marruecos (Fondation Mohammed V pour la solidarité). Programa INDH (initiative nationale pour le developpement humain).....!!!

Quien es empleada por esta asociación? Donde se encuentran los expertos y los técnicos? Son de marroquinos o de fuera?

Los dos! Hay expertos técnicos marroquinos y de fuera. Cuando empezamos proyectos de energía solar, tenemos formaciones de los expertos de España y después nuestros técnicos se encargan de todo. Toma el ejemplo de Youssef y de Taoufik y otros. Cuando hay algo complicado, hay técnicos de Isofoton y otros técnicos al nivel de Ouarzazate o de otra ciudad.

Lo que quiero saber es si estos proyectos están creando trabajo en marroquinos o no. También, me parece que Pepe y Toufik trabajan muchísimo. No hay otros trabajadores? Son empleadas por la asociación o Isofoton, o los dos? Porque no hay más técnicos en la zona? Isofoton no emplea algunas personas?

Los proyectos están creando trabajo importante en marroquinos. Tú puedes imaginar para instalar muchos paneles solares en marroquinos cuántos técnicos faltan. Por ejemplo Isofoton en el término del PERG solar empleada más de 80 personas marroquí (son salarios a tiempo completo). Es decir 80 familias. Solo dos españoles. Pero estos proyectos emplean otras personas en los pueblos de una manera indirecta.

Hay muchos pueblos que establecen un Cooperativo para obtener energía solar. Es que después piden la asociación Tichka por ayuda cuando quieren energía? Cuánto pagan por obtener la energía, y de donde viene el dinero? Las personas del pueblo son siempre felices con su sacrificio del dinero?

En principio la gente no paga nada para obtener la energía. Pero por los proyectos de agua potable, la gente debe contribuir con la mano de obra, y realizar tareas locales como el depósito de agua, la red de distribución de agua, instalaciones dentro de sus casas (tubería, grifos de agua, comprar contadores de agua y pagan a su asociación del pueblo la consumación de agua. El dinero colectivo sirve para comprar componentes que no funcionan.....

La energía que viene del ONE Pepe se llamaba ‘la red’. Quiero saber más de la red: porque los pueblos que ya tienen energía solar cambian por la red? Es la red mejor que la energía solar?

Mira. Cuando no hay electricidad de la ONE la gente utilizaba la gasolina el daz y todo traditional que son mas caros. El petrol es muy caro. La alternativa es la energia solar. Y cuando llega la red nacional; por las aplicaciones individuales la gente opta para la red y para sacar agua prefieran el solar porque es muy barato.

Es la energia solar solo por los pueblos que no pueden usar la red? Es importante que la energia solar es mejor por l'ambiente y puede ser renovado? O no es importante como viene la electricidad, almenos que el pueblo la tiene?

Como funciona Isofoton? Tiene oficinas en otras paises, o solo Marueccos? Pepe me dijo que Isofoton estaba ayudando Tidzi paga con el installamiento de las panelas. Es verdad?

Isofoton es un gran empresa espezilizada en el tema de la energia solar y el termico (agua cliente) Isofoton esta en mas de 50 paises en en mundo. Es la primera empresa en espana, la secunda en Europa et la 6 en el mundo. Es la Fundacion Energia solidaria de Isofoton que ayuda Tidzi.

Para saber mas te pide consultar el site web de La ONE, CDER, Isofoton y de su Fundacion.

Mi espanol no es perfecto y tengo problemas para formular expressones y palabras buenas. Saadia va enviarte algunos documentos en frances sobre Tichka.

Saludo

Si tu quieres ensnar mi nombre y el de Youssef no problema:

Tu tienes mis Tarjetas

BON COURAGE

Appendix B: Statement of Consent

Purpose of Study

This research study is focused on rural sustainable development. I am researching the promising field of renewable energy in Morocco in order to get a sense of rural development projects in Morocco today; the amount of funding that is available, the demand for bringing development to rural areas, and the feasibility of such projects. I will be looking in depth at a specific case of sustainable development in rural Morocco, in Ouarzazate, as a possible prototype for similar successful ventures throughout the country, specifically in Boujad.

Duration and Elements of Study

The study will be conducted over a period of three weeks, from April 19 to May 10 2008. It will include observations of participants as well as interviews and fieldwork.

Risks

The study has no foreseeable risks for participants. However, if you feel uncomfortable with the observation or interview process at any time, you are free to terminate your involvement.

Compensation

Participation in this study will not be compensated, financially or otherwise. However, your assistance is greatly appreciated by the student researcher.

Confidentiality

Every effort to keep your personal information confidential will be made in this project. A final report at the end of the project will be written and presented in front of a panel of scholars. If you feel uncomfortable with your name or any other identifying information being used in this report, please let the student researcher know and she will be more than happy to ensure that all information will be completely confidential. Your names and other identifying information will then be changed in the final write-up, and will only be known to the research team.

Participation

I, the undersigned, have read the above statements. I affirm that my participation in this study is voluntary and understand that I am free to withdraw my consent at any time without penalty.

Signature

Date

I recognize that this study involves interviews and/or observations that may be audio-recorded and transcribed.

Signature

Date

Research Team:

Researchers may be contacted by e-mail or telephone for any reason:

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