

The Energy Shop

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The Energy Shop is a new concept which gives us the opportunity for a gradual transformation for the use of RE for more and more energy services. It is based on those initially solutions that give the highest cost-benefit. Solar cells that are used to charge the local population's mobile phones in remote villages in developing countries that have no other energy supply hold the vision for the energy supply of the future. The 2 billion people in the developing countries need urgently modern energy supply.

As soon as mobile telephone transmitters are erected, it will be a high priority in the poorest towns and villages to buy mobile phones in order to be able to contact those that have moved away from the village. They buy the mobile telephone even though there is no opportunity to charge it. They are able to get by without light in the evening. Refrigerator and television is also out of reach due to their high energy consumption. People will probably have a small radio that runs on AA batteries. Charging of mobile phones might be the start of modern electricity supply in rural villages. Not in terms of electricity from a traditional power plant, but from a small charging station that can charge 10 telephones at a time and has the possibility of being extended to become a local "energy shop", i.e. a centre of renewable energy supply in the village.

The energy supply is restricted by the economy of the community a single solar panel at 60 Watt can cost as much as two annual incomes. Villagers cannot afford to get their own solar cell plant, but they pay 50 EURO cents every time to get their mobile phone charged. This is equivalent to a kW hour price of more than 150 EURO which illustrates an extremely high utility value of electricity used for such purposes.

The energy shop has to evolve from the first step which is to offer a mobile phone charging facility. With time the shop can deliver more and more energy services based on renewable energy. There already is a need for the charging of batteries which people transport over many kilometers on their bicycle or their head to the closest charging point. The battery that generally is a discarded car battery, is used for the electricity supply of televisions, radios and lighting for millions of African homes this is the only way of getting access to electricity.

Today, the batteries are often charged with a small diesel generator. The energy shops can offer the alternative of charging batteries from solar cells within the six hours of intense sunlight.

The sun's rays are turned into electricity in PV panels. Via an inverter the electricity produced by the cells is directed towards the different consumption places. Solar cells of good quality have a life span of over 20 years. Just as other forms of electricity production facilities, many years of payment time call for relevant investments. The Energy Shop is therefore to be financed with contributions or with long-term loans.

As the Energy Shop gains acceptance and is introduced in more areas as an alternative to public electricity supply, investment models with the same return and time frame that one would have to had brought into play for a traditional electricity supply system, will develop naturally.

The Energy Shop has the advantages that it calls for lower first-time investments and has no operation-expenses for fuel. The Energy Shop is a profit creating company.

Besides offering the charging of cell phones and batteries for the households

the Energy Shop should also be able to deliver electricity to a range of users, who chose to live near the centre. In this way a large number of services and small business can thrive in the community. The expansion of the Energy Shop with a number of modules should be planned. They can be installed on surrounding buildings with wires running back to the Energy Shop. An electric meter for each customer is installed at the Energy Shop.

Other payment methods can also be arranged. For example, the use of can be limited to two 10 Watt low-energy light bulbs for an agreed number of hours. If the customer would like to gain access to other energy services a new agreement will have to be made. To summarize, who can then profitably buy electricity at the Energy Shop and create new business prospects:

1. The tailor's workroom can change from hand sewing machines to modern electric devices and this increase its capacity.
2. By cooling- and freezing meat, fish and other goods, they can be stored for later sales.
3. The women's time consuming work of grinding grain and millet can be replaced by small electric grinding machines.
4. Oil mills can be used to make fuel for diesel engines in tractors and cars and for cooking oil from *Jatropha* or other types of oil seeds. The by-product is protein rich fodder for animals.
5. The carpenter can replace the hand-saw with electrified tools that are relatively cheap today.
6. The production of souvenirs, handicraft products and household articles is easier with electrical machines, for example engraving and polishing.

Additionally to these examples, many other forms of small companies and businesses may arise that can use the created access to modern energy supply without having to invest themselves into their own electricity production plants. Examples include ironing shops, IT with photo copying etc.

An important second aspect is the possibility of improving the public infrastructure with schools, clinics etc. once the electricity supply is well-established.

1. In the schools there will be access to computers. Electrical light gives the opportunity for evening classes, especially for the many women, who did not have the opportunity to learn how to read and write as children.
2. At clinics, electrical light will enable a safe treatment in the dark hours of the night.
3. Maternity homes will be more attractive than giving birth at home which will reduce the risk of death both for mother and child (up to 20%).
4. The drug store can store vital tropical medicine in refrigerators.
5. The market place can be lit, which will create more security, especially for those women who are coming from far away to sell their products.
6. Electrical water pumps can raise water from deep reservoirs and the water can then be distributed to the houses through pipes. Old wells with a high risk of infection can be closed or replaced.

The Energy Shop may become the start of new energy opportunities. In most developing countries a limited part of the population receives electricity from the public grid, which covers only the built-up areas in the cities. The countryside districts on the other hand, have no electricity supply even though this is where the majority of the population lives. This is the case in a large

number of African countries. In Mali, for example, in West Africa only 7 % of the inhabitants have access to the electricity grid. In Namibia, in South Africa, the number is 30 %. Even though the countries have now had electrification schemes as a high social priority for decades the number of inhabitants, who are still without electricity supply is growing. This is the case due to the high costs involved extending and creating conventional electricity capacity. Moreover conventional applications are growing compared with electricity supply based on individual households and companies supply based on renewable energies, or the establishment of so-called "mini-grids", local, autonomous electricity supply installations, which are not connected to the national electricity network.

The installation of mini-grids will be more cost efficient in the long run, which can be illustrated with examples from Namibia. For the connection of a small urban community to the national electricity supply the cost of 250 km transmission lines and required substations already amounts to 6 million EURO. On top of this investments will need to be made to increase the capacity of the existing coal-based power stations.