

## Market-Oriented Policies for Rural Electrification

Category: Poverty Reduction and Health

Limited access to adequate energy services in rural areas of Namibia (only 6% of the rural households have access to electricity) is considered as one of the main reasons for the imbalance in socio-economic development between rural and urban areas. The dissemination of Solar Home Systems (SHS) and Photovoltaic (PV) pumps could improve this situation. After a five year promotional programme, the approach of a market-oriented dissemination strategy based on public awareness, loan schemes and training of local technicians has proven sustainable. In total, about 600 households joined the „HomePower!“ programme and purchased an SHS, using the loan scheme provided by the project. It has become evident that even small solar home systems have a distinct impact on the quality of life in the countryside. The Namibian Government has therefore decided to launch a rural electrification policy based on a master plan defining grid and off-grid areas and providing subsidies for off-grid electrification by means of SHS.

### Challenges

In Namibia, most rural households still largely depend on traditional fuels such as firewood, candles and kerosene to cover their energy needs. Social services such as schools and clinics are inadequate due to the lack of staff and facilities, and in many areas water supply by wells is insufficient for human consumption as well as for irrigation. Due to the low population density and the long distances between settlements, it is economically unfeasible to connect all households to the national electricity grid and to provide piped water. Decentralised options had to be identified and tested.



### Strategies

The energy policy objectives as pursued by the Directorate of Energy were:

- To assess and evaluate the potentials of all national energy resource
- To develop the economically and technically exploitable resources
- To achieve an equitable distribution of energy services in all regions
- To set up an adequate regulatory framework and
- To increase the efficiency of energy services.

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Training of vegetable farmers has not only increased cash crop yields, but has also resulted in local people eating more vegetables, which in turn improves local diets and generates additional income.

### Main steps

In order to achieve these objectives, the key elements of the implementing strategy were determined as follows, based on the findings of a one year orientation phase in which the major obstacles for a large-scale dissemination of renewable energies in Namibia as well as the most appropriate renewable energy technologies were identified:

- Awareness-raising by publicity campaigns and demonstration projects. With the target groups and their needs (demands, expectations, anticipations) identified, public awareness campaigns were launched including advertisements in newspapers, on local radio stations and the national TV channel, expositions of material on-site and discussions with potential users. It was found that most rural families were not aware of the options of decentralised electricity supply, so that this campaign was repeated twice, considerably increasing the level of awareness and, hence, demand. In order to demonstrate to the rural population how a PV-system works, suitable sites for pilot installations such as schools, agricultural extension service centres and rural clinics were identified and equipped with SHS free of charge. In total, about 40 clinics, 30 schools and 10 service centres have been equipped with PV-systems. Since all these institutes are used by the public, people could see and touch the systems they eventually then bought for their own homes.

- Training of local technicians. In order to create a comprehensive local installation and maintenance network, about 100 local technicians from all provinces of Namibia were trained in PV-technology. These technicians were certified in order to become eligible as SHS retailers and installers for the urban town-based solar companies. They are paid on a per system basis and are expected to develop their own private businesses.

### Financing Schemes

With the high upfront investment for an SHS (from US \$900 for a 50 W<sub>p</sub> (Watt peak) system up to US \$3,500 for a 250 W<sub>p</sub> system including all fees for handling, administration, transport, installation and insurance over 5 years) exceeding the financial capacities of most rural households, it was essential to provide appropriate credit facilities.

Since the commercial banks were rather reluctant to cope with small-scale loans in rural areas, the project established a Peri-Urban and Rural Solar Electrification Revolving Fund in cooperation with the Namibian Development Cooperation (NDC) that is jointly financed by the Namibian Government and foreign donors.

### Socio-economic Impact Monitoring

The Government of Namibia and GTZ launched a study to examine socio-economic impacts of rural electrification in the country on private households as well as on rural services and businesses. Research focused on:

- Assessing the impact of electricity, both grid and off-grid, on energy consumption patterns in households
- Examining the impact of electrification on household welfare, and
- Investigating household members' perception of electricity

Close to 400 grid-electrified, solar-electrified and unelectrified households in rural areas of Namibia were surveyed.





## Benefits and Impacts

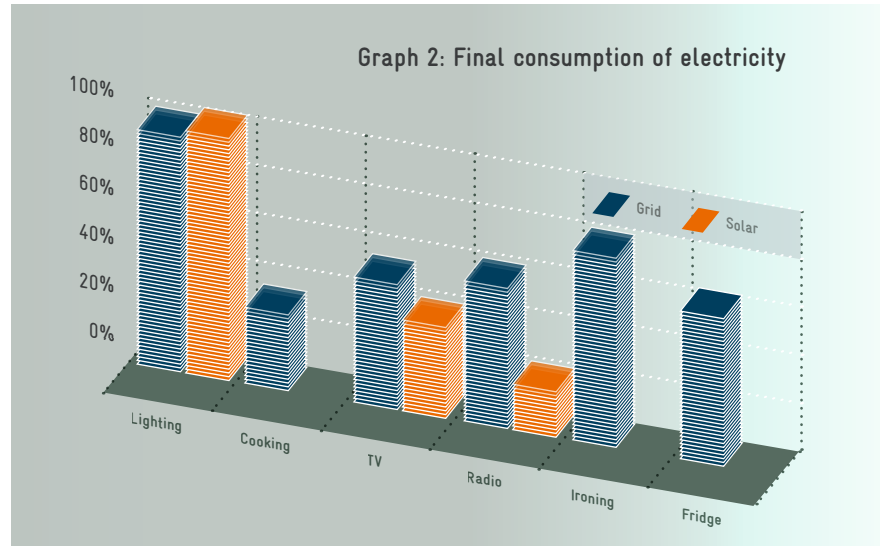
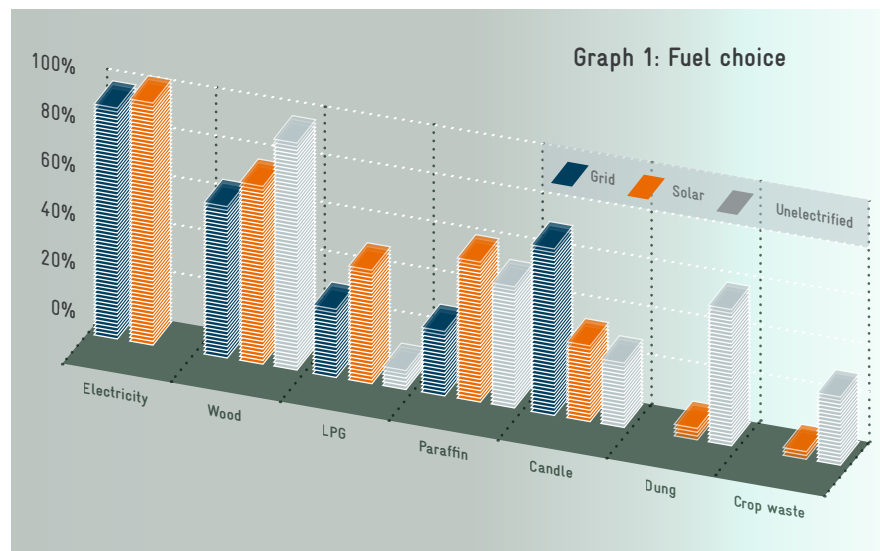
The range of energy carriers consumed by the three household categories are similar except for electricity, as is shown in *Graph 1*.

After electrification, households still tend to use a range of fuels and do not necessarily or immediately switch to electricity for all energy services. Although electrified households take advantage of electricity for lighting, the use of candles remains surprisingly widespread. This is partly in response to supply interruptions, but also because not all rooms have electric light bulbs. While electrified households do make use of non-electrical fuels, it is noteworthy that the prevalence of paraffin and wood is lower in electrified households than in the other two groups, suggesting some transition away from these traditional fuels.

The services provided by solar home systems are technically limited to low-load energy services, so these households have to rely on alternative fuels for thermal energy needs. The group of solar-electrified households made the greatest use of LPG, which can be attributed to their higher incomes. Low-quality fuels such as dung and crop waste are only prevalent among the unelectrified households, which, however, may also be attributed to the higher concentration of these households in the lower income category.

As shown in *Graph 2*, grid-electrified households can use electricity for a wider range of services than the solar-electrified households because of the limited energy available from solar systems. When asked about the indicators of change in daily life, about 90% of electrified households announced their satisfaction about an increased level of safety and cleanness, while 50% of the households indicated improved health conditions, and about 12% of the electrified households reported that the improved quality of lighting had resulted in a better working environment

for schoolchildren, men and women (see *Graph 3* on next page). In this respect, no distinct difference between grid and off-grid electrified households could be observed. Considering these aspects as poverty-related issues, it can be stated that electricity has definitely contributed to poverty alleviation in remote rural areas. This was achieved by the provision of high-quality lighting which has extended the day for various activities including reading, watching TV and socialising and by improving the quality of social services such as education and health.





Having electricity makes households feel safer at night thanks to the better light provided compared to candlelight and paraffin light, and gives them better access to information and entertainment. On average, electrified households stay up later in the night than unelectrified households because they have access to good-quality light. Importantly, this allows teachers to prepare classes in the evening and students to do their homework.

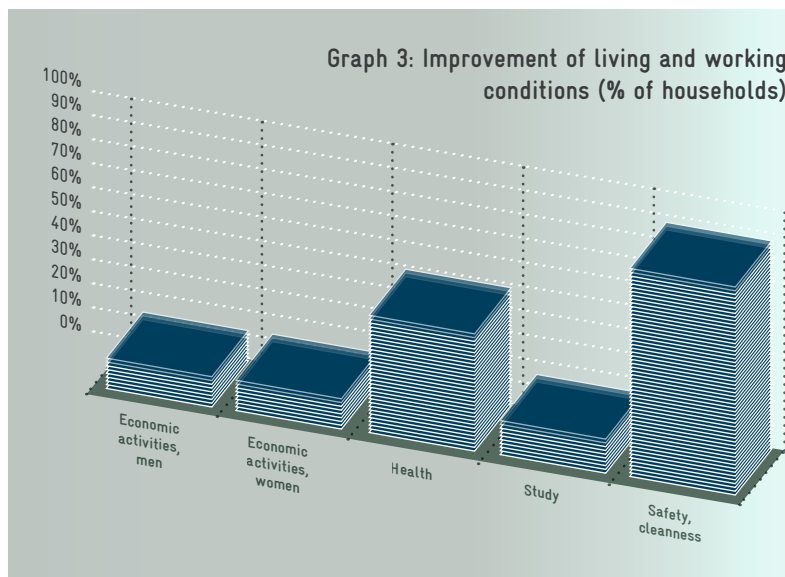
In an inspection report, this reads as follows: *“The solar systems in all schools and clinics are working accordingly and no complaints have been made. All schools are very happy with the systems because it is understood that since the systems were installed, schools have started giving classes during the night. This has brought improvements in the passing rate of each school.”* (Ms M. Iyambo, Assistant Engineer, Dept. of Works).

From his last service trips, Axel Scholle, the project manager, brought the following statement: *“Some teachers expressed very clearly that due to the lights that are now installed in the schools and homes, the average marks of the students have improved significantly.”*

However, electrification has not had direct impacts on diversification or growth of income-generating activities. The households interviewed have not established any new businesses relying on electricity since having access to it, but they have already improved existing businesses thanks to better lighting, refrigeration and TV/radio.

## Lessons learnt

To summarise, it can be stated that rural electrification on its own is necessary, but not sufficient to foster economic development and raise social standards in remote areas. It should always be integrated into overall rural development programmes including other infrastructure such as water supply to improve rural health, roads to facilitate the trading of products, educational programmes to prepare people for new jobs based on electricity, and information campaigns to inform people about the potentials of using electricity businesses.



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Deutsche Gesellschaft für Technische  
Zusammenarbeit (GTZ) GmbH  
Division Environment and Infrastructure  
Dag-Hammarskjöld-Weg 1-5  
65760 Eschborn, Germany  
T: +49 6196 79 - 13 03  
F: +49 6196 79 - 80 13 03  
E: [energy@gtz.de](mailto:energy@gtz.de)  
I: [www.gtz.de/energy](http://www.gtz.de/energy)

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