

# An Affordable Formula for Financing Solar Electrification

Will Cawood

About two billion people around the world still do not have access to electricity.

But in South Africa, a financial model has been developed that allows Third World families to finance solar power systems for what many would otherwise spend on candles. The model is alive and well in Maphephethe, a rural community of 20,000 people about 80 km west of Durban.

The Solar Electric Light Fund (SELF) is a non-profit solar development organization based in the United States which helps rural communities acquire their own electrical power from the sun. In addition to the electrification of Maphephethe, here in South Africa, SELF is involved in projects in Uganda, China, Sri Lanka, India, and Indonesia.

In Maphephethe, we've installed a solar electric lighting system in the courthouse and adjacent offices, and we plan to fit up to 100 dwellings with solar home systems. In conjunction with the KwaZulu Finance Corporation, we have developed a formula for Third World families to finance their own solar units. We hope this formula will eventually provide an answer for at least half of the 3.5 million South African families who have yet to receive electric service from the grid. Naturally, the KwaZulu Finance Corporation can't afford to provide solar home loans to families everywhere. But we've been meeting with the Development Bank of South Africa, and are hopeful that other commercial banks will get involved in this project as well.

## As Cheap as Candles

Our solar project is not being subsidized, and families interested in a solar home system will have to finance it on their own.



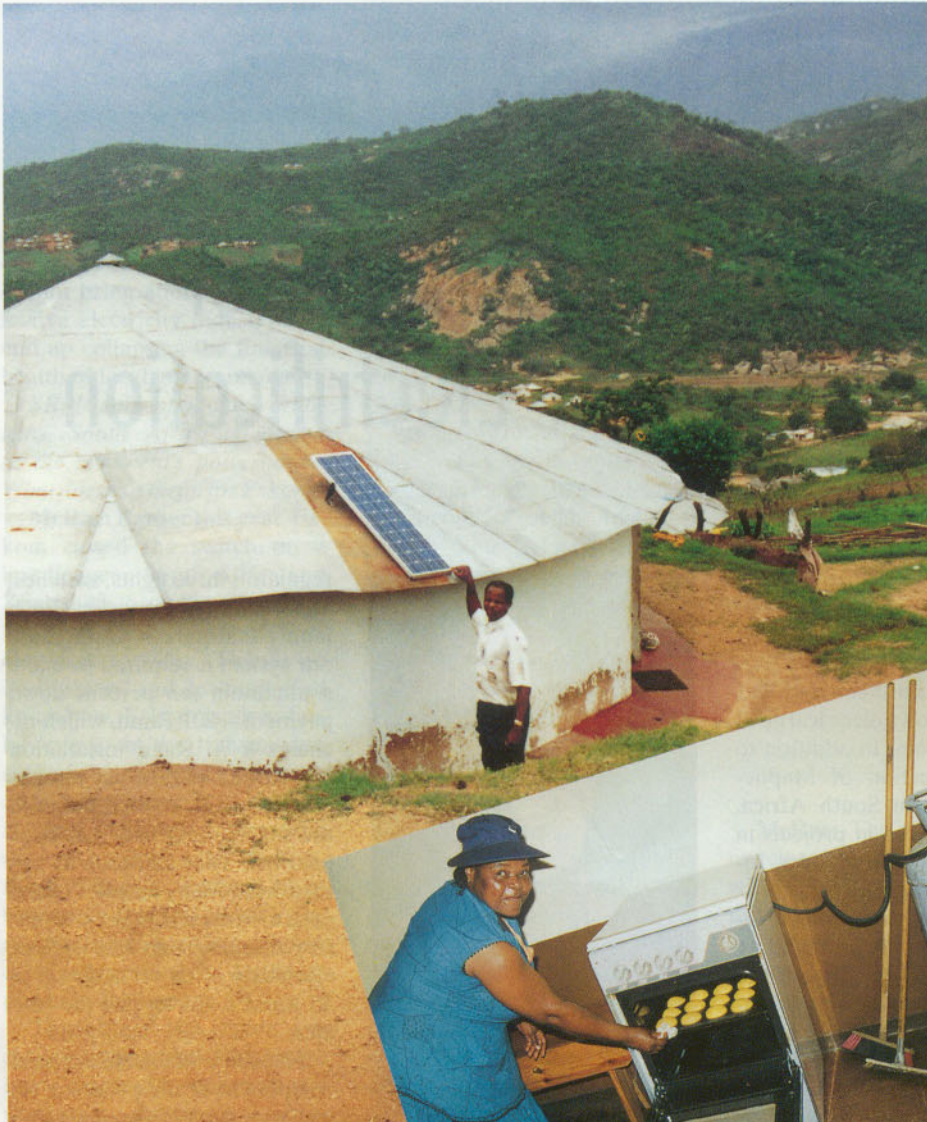
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Involved in the solar energy industry since 1973, Mr. Cawood, who holds a degree in engineering, is a project manager for the Solar Electric Light Fund, a Washington, DC-based non-profit organization. He has been responsible for the introduction of solar systems to numerous communities in South Africa.

We charge 2010 Rand (roughly \$500) for one 53 W Siemens module and one 100 amp-hour battery, which provides enough back-up storage to operate appliances for about three cloudy days. The system also includes a

regulator, three lights, switches, and a plug for television. Each family that agrees to purchase our system is required to make a minimum ten percent down payment – 201 Rand, which includes a 70 Rand installation fee. Residents then pay monthly installments of 52 Rand until the outstanding sum has been paid off. That amounts to less than what many families spend each month on candles and battery charging. Families without electricity often set aside up to 30 Rand a month just for candles.

Finance is of course a crucial component in the program. So we entered into discussions with the KwaZulu Finance Corporation (KFC), which specializes in funding projects in rural communities. Two schemes were developed. The first was very standard and was intended for individuals who have a permanent job and a personal bank account, from which monthly payments would be deducted via a debit order. The second and more imaginative program was for families without permanent employment. In this case, a loan agreement was entered into between the KFC and five families, not a single individual. The group – not the individual – would be responsible for repayment, and all five systems would be repossessed if any one of the five families defaulted. It is hoped that in this way the



members of the group will assist one another and also police themselves.

Our offer is financially viable, and the systems appear to be affordable to the community, so the project should be self-sustaining. Furthermore, once residents see the benefits of solar power in their neighbors' homes they generally also want a system. If this model proves to be really successful, then of course there's the rest of rural South Africa.

**Light Now, Not Later**

Although many families find our 201 Rand deposit charge rather steep, the remaining

**Maphephethe's Chief Gwala points to the solar panel mounted on his roof, the first of 100 to be installed in his community.**

**In addition to promoting solar-powered electrification in Maphephethe, SELF is trying to convince residents to use gas for cooking, rather than cutting down trees.**

three to four years of payments are more affordable, and there are no subsequent costs other than what people spend on servicing the battery now and then. For this very modest investment, a family can have enough electricity to light up a home and operate small appliances.

Grid installations provided by Eskom, the national electricity provider, on the other hand, cost between 7000 and 9000 Rand each, meaning that a 20 year financing period is needed to break even on each hook-up, assuming a household consumes 350 kWh per month. Figures show, however, that the average household in rural areas

can only afford to use about 100 kWh of electricity per month. It therefore seems unlikely that Eskom will ever be able to provide grid power to communities like Maphephethe without incurring astronomical debts.

Some questions have arisen as to whether solar power can satisfy longer-term energy needs as families purchase more and more electrical appliances. But upgradeability is definitely part of the SELF program; so, as their incomes rise, families will be able to invest in more solar panels, larger batteries, and invertors for AC power.

Providing people with proper indoor lighting can have a major impact on their lives. At the University of Cape Town, the Energy for Development Research Council conducted a study showing that once people have access to electricity their level of education improves markedly. Without electricity, children have to strain their eyes studying by candlelight. In school they're tired and generally don't perform as well.

**Birth of a Cottage Industry**

Generally, the key to making these projects work is getting the community involved. If the project is ever going to be self-sustaining it has to create jobs in the local community. People have to begin selling their own systems; others will need to install them. And of course there will have to be those in the community who can maintain and repair the systems if something goes wrong. All of this adds up to a measure of independence— independence from the cities as the sole source of income and expertise, and energy independence, which, after all, is what communities such as Maphephethe always had in the form of wood.