

Fabio Rosa¹ Brazil (1960-)

Fabio Rosa's ambition and passion is bringing electricity to the poorest people of Brazil. He's been working on it for 25 years, and in that time he figures he has brought electricity to at least a million poor families.

He is an agronomist² and engineer by training; but to accomplish what he has done he has had to know about politics, banking, and business, as well as irrigation and solar power.

His work is undoubtedly going to be of great importance all over the world. New models of how to get electricity to rural areas are badly needed.



Fabio Rosa
(From Bornstein, 2003)

The Problem: Electrifying Rural Areas

Nearly 30 % of the world's population still lacks access to electricity. Isn't this a shocking figure? These people are being left farther and farther behind, technologically-speaking. They are not able to hook in to the internet and profit from other sources of information. Nor can they benefit from income-producing machinery such as irrigation pumps or looms, or from household items such as refrigerators which the other two thirds of the world takes for granted.

The traditional method for getting electricity to an area has been to extend the electrical grid (network of wires connected to electricity source) to the area. The cost of extending the grid is usually paid by charging a connection fee to each new customer, but this system doesn't work where people who are to receive the electricity are very poor. It costs a business more to deliver the electricity than the customers are able to pay.

In many countries or areas the government has supplied the needed funds or even stepped in to run electrification projects. However, in many places, including Brazil, provision of electrical services is done entirely by private companies. These companies in the past have not seen how to make money delivering electricity to poor, far-away customers (and every business must make money, or it won't survive).

This has been the case in Brazil since the late 1990s, when the electrical system was privatized. Before that, Fabio focused on lowering the cost of connecting rural areas to the grid., which is what he was doing in Palmares.

¹ Actually Fabio Luiz de Oliveira Rosa

² Person skilled in agronomy, the science of soil management and the production of field crops.

Palmares: Extending the Grid Cheaply

In 1983, at the age of 23, Rosa became the Secretary of Agriculture in Palmares, in southern Brazil. Over 70% of the population of Palmares lacked electricity. The cost of extending the grid to a single rural property was estimated at \$7,000— three times the average annual income.

Rosa quickly discovered that the local farmers had a huge problem: water. Even though the water level underground was high in Palmares and could easily be reached with a well, poor farmers had no way to run a pump to get the water. Instead, they were buying water at high prices from more wealthy farmers who had wells.

Around this time Rosa learned about the work of Ennio Amaral, a professor at a nearby technical school, who had developed a very cheap electricity-delivering system. Instead of cement poles, he used wood; instead of copper wire, steel; and the conductors were steel and zinc instead of aluminum. Instead of three wires, he used one. He also cut costs by using small transformers³ and increasing the spacing between poles. He had been working on this system for ten years, but he couldn't get permission to install it anywhere except on his test site. The electric company didn't like the design, and refused to turn on the electricity to any system they did not approve.

Rosa went to the state governor and got permission to install a similar system in Palmares as an experiment. He had figured out how to extend the grid to Palmares residents for only 10% of what it usually cost, by using Amaral's ideas with certain changes, such as attaching the wires to existing poles and trees. To further cut costs, he got local volunteers to build the system. They were interested because the system would provide them with access to electricity for a price they could afford — about the price of a cow.

He had to work with the newspapers and local officials to overcome opposition not only from the electric company, but also from the cement and aluminum industry, and other sources. He persuaded the Brazilian National Social Development Bank to provide a loan.

Finally, in 1988, four hundred families were connected to the grid for a cost of \$400 to \$600 per family. As a result of this project, farm incomes increased because farmers were able to use water pumps, and before long they were also able to buy items such as refrigerators or television sets.

Bringing electricity to Palmares also had another unexpected and welcome consequence: people who had gone to the city looking for work returned — a reversal of the usual trend where there is extreme rural poverty. Rosa estimated that one person

"At this moment we have millions of people without energy, just like we did 10 years ago, just like we did 20 years ago. Brazil has this problem. India has this problem. China has this problem. Bangladesh has this problem. Two billion people have this problem."

--**Rosa, 2003**, as quoted by **Bornstein, D.**

--In:Bornstein, 2003

³ Boxes on telephone poles that decrease strength (voltage) of electricity as it goes out from where it is made (very high voltage) to the user (much lower voltage).

returned for every three people that now had electricity. Improving the lives of people in rural areas thus has consequences on a number of levels, both social and economic.

Project Light

The Palmares project got the attention of Ashoka, an organization that seeks out and supports "men and women with system-changing solutions for the world's most urgent social problems."⁴ Ashoka provided Rosa with some money to live on for several years, thus enabling him both be independent and to improve his system.

Then he was asked by the director of the Brazilian National Development Bank to oversee a project to replicate the Palmares Project in other areas. In only three years, Project Light brought electricity to 25,000 more low-income people. This new project showed that the Palmares design and methodology would work in many kinds of situations.

In 1996, two other projects followed in other parts of Sao Paulo, reaching over a million rural households. Things were going very well. Then, everything came to a halt in the late 1990s after Brazil's electric utilities were privatized.



The new owners had no interest in extending their grid to the 25 million poor Brazilians still without electricity. Even though Rosa had shown it was possible make a profit doing it, and that it had very desirable positive social consequences, they just couldn't or wouldn't stretch their concepts of how to do the electric business (business model) enough to embrace the changes needed to serve this segment of the population.

Fortunately, however, Rosa had already begun in the early 1990s to experiment with ways to bring solar energy to people.

Solar Home System

Solar energy is an obvious solution for isolated areas, but there are two obstacles: creating a business to provide it and designing a reliable affordable system that provides what people want.

The business must be able to deliver a product the rural poor both want and can afford, and to manage everything effectively over great distances. It must be very efficient, too, because there will be many small

transactions and the cost to the company per transaction has to be kept small.

Fabio and his colleagues did market research to find out what their potential clients wanted and what they could afford. Their first important finding was that their future clients had little interest in or ability to buy solar panels or in anything complicated. They just wanted to have lights and other things electricity makes possible. The researchers also discovered that about 70% of the families they interviewed were spending more

⁴ See www.ashoka.org a number of the other people featured in this book are also Ashoka fellows

than \$11 US each month on energy items like candles, kerosene, gasoline, and batteries. Many of these were spending more than \$25 per month.

Fabio and his colleagues invented a simple solar system that would work both for the clients and for their business. They call it the Solar Home System. It consists of a solar panel, battery, lighting fixtures, and electrical outlets, and delivers 12-volt electricity.

The battery and other sensitive components are sealed into a special clear plastic box they designed. This box is the result of several generations of design changes in response to problems encountered over the years. The system takes only an hour to install, and requires no maintenance other than replacing the battery after the end of the three-year contract. The solar panels have a lifetime of 25 years. The company installs and maintains the system, including battery replacement at the end of year 3, and owns the components.

The Solar Home System provides, per day, an average of 6-7 hours of lights and a few hours of radio, TV, and water pump usage. The installation cost, \$150 US, can be paid off in 12 months. Kits are also available for \$16 and \$24 per month, enabling people to operate a 12-volt TV, refrigerator, shower-water heater, or generator.

The Business Aspect.

Instead of bringing in people from outside, Rosa and his staff get to know a community and identify people in that community to work with who have influence and/or are respected businesspeople. These become the local contacts for the user. They do installation, take care of problems, and collect fees. This is an important point, because in rural communities, people tend to know each other, and trust is essential. This approach also helps to overcome political opposition at the local level and benefits the community by putting the money people pay back into their own community.

"A project only makes sense to me when it proves useful in making people happier and the environment more respected and when it represents hope for a better future."
--Fabio Rosa

Active marketing is also required, because the acceptance rate at first is not always high. People are used to their candles and kerosene lamps. One selling point is that electricity is cleaner — people won't be breathing candle or kerosene smoke, and their walls won't be black any more.

Sometimes representatives of the electrical company come around telling people that the grid will be soon extended to them and that they should wait for it; but so far these promises have not been kept.

Solar energy can be more reliable than grid electricity. Brazil's electrical grid depends on one central source: a hydro electrical project (dam). Brazilian residents have had to do without electricity at various times in the past, sometimes for quite a while, due to problems in this system (for example when there is insufficient rainfall and dams can't produce enough electricity).

The Solar Home System is part of a project called The Sun Shines For All (TSSFA), and it is administered by STA Agroetro (Agroelectric System of Appropriate Technology), which Fabio established in 1992. This is a social-purpose business, where the profit goes back into improving or expanding the services provided, not one primarily

aimed at putting money into someone's pocket. The social purpose is of course the same as Rosa's passion: improving people's lives by bringing to them electricity they can afford.

STA started the pilot TSSFA project in 2003, and by the end of July had installed 41 systems. The STA staff estimated that they would break even after installing the first 7000 systems, which they thought might take around 4 years. (If you are interested in more details, please see References and Further Reading— especially the University of North Carolina report).

One of the biggest obstacles to establishing a business to serve rural clients is startup money. Since lenders generally think that poor rural clients will not pay reliably, the nonpayment risk is considered very high. So the interest on bank loans is too high. Fabio has had to seek financing from organizations which are giving away money to support solar energy or to support social entrepreneurs.

One development that gives hope to people like Fabio, if they can navigate the political channels, is that many countries are developing national solar programs. This includes Brazil (see Radler, 2006). As we saw with the Palmares project, to make a project work on a limited scale is one thing. To get it replicated and integrated into a larger national system can require considerable political skill, as well as a measure of luck and a great deal of persistence. But as we have seen, Fabio is a very determined and passionate guy.

Electricity for The Poorest of the Rural Poor

For the 30% of the rural poor who cannot pay even \$11 per month, Rosa and his colleagues have come up with an even bigger vision: the Quiron Project, which is managed through a not-for-profit company they established, IDEAAS (Institute for the Development of Natural Energy and Sustainability).

They plan to empower the poorest of the poor to earn more, so that they can afford to pay for electricity, through micro-lending for solar-powered and other projects that increase income production. (For some general hints about what might be done, see Rosa, date unknown). Rosa already had acquired considerable experience with various elements of providing these services during the 1990s. As of 2004, the latest date for which I could find information, Quiron was still in the planning stages.⁵

References and Further Reading

The information in the article above came from the following sources. Many of these articles overlap, but they are slightly different in detail. I took some idea or fact cited or quote from each of these.

Bornstein, D. 1998 *Changing the World on a Shoestring*. From the Atlantic Online website: <http://www.theatlantic.com/issues/98jan/ashoka.htm> . One of the best articles on the Palmares project.

⁵ If you are interested in this, see the University of North Carolina report and the IDEEAS website, and check the internet for more recent information. If you are interested in the whole question of providing services to low-income communities, see Budinich, 2005

- Bornstein, D. 2003. *Fabio Rosa: Making the Sun Shine for All*. On the Changemakers website: <http://proxied.changemakers.net/journal/03may/bornstein.cfm>
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- University of North Carolina Kenan-Flagler Business School, 2004. Mugica, Y. *Distributed solar energy in Brazil: Fabio Rosa's approach to social entrepreneurship*. Very much a business-oriented discussion of STA and IDEAS solar projects, their planning and projected implementation. To find it, go to the University Network website: <http://www.universitynetwork.org/node/218> -- I also found it at: http://www.nextbillion.net/files/DistributedSolarEnergy_3.pdf

Discussion or Essay Questions

When you talk or write, please try to use some of the new words you have learned in this reading. If you have noticed new grammatical structures, try to use them, too.

1. What are the possible benefits of bringing electricity to a rural family, village, or area in a country? What are the benefits to them, and what possible benefits are there for the rest of society? Can you think of any negative consequences? Do you think the positive outweighs the negative? Explain your answers.

2. Do you think solar electricity has advantages over electricity delivered through a grid from a central location? Are there disadvantages? Discuss with examples. (for ideas you can refer to Radler, 2006)
3. Name an NGO (non-governmental organization) in your country, and another which is international. Some people are calling them "citizen groups" who are trying to solve social problems using new approaches because government seems to be doing nothing. Tell what they do. Why do people form them? Do you have any objections to NGOs?
4. How do or how can NGOs affect the policies and actions of governments or businesses? Give examples.

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