ELECTRICITY FOR SENEGAL

A German micro-energy provider, a Senegalese-German development programme and a committed village community in Senegal have brought electricity to the remote village of Sine Moussa Abdou. They are even winning international awards for their innovative business model.

Text: Gabriele Rzepka
Everywhere you look there are circuit boards, rolls of cable, control units, modulators and devices to measure wind speed. INENSUS GmbH operates on the premises of the Energie-Forschungszentrum Niedersachsen, an energy research institute based in Goslar, Lower Saxony. It is here in Germany’s Harz mountains, where the towns and villages still have traditional cobblestone streets and the houses timber frames and slate roofs, that it all happens. In the production halls, everything revolves around energy – wind energy in particular. Nico Peterschmidt, Holger Peters and Jakob Schmidt-Reindahl got their idea following a student project on wind farms for developing countries; by 2005 their vague concept had taken on a more concrete form and after graduation, the three set up their own company specialising in products and services for small wind turbines. Before long they had gained a firm footing on the European market.

**CONNECTION TO THE OUTSIDE WORLD**

From the outset the company was also committed to Africa. The three entrepreneurs worked on island grids, so called because they are not connected to the public electricity grid. These grids function entirely independently and are hence invaluable in providing energy to rural regions. The systems are only expected to generate a few kilowatts, just enough to supply outlying villages with electricity. ‘What interests us is the interface between technology and a functioning business model at village level,’ says Nico Peterschmidt of his company’s concept. In 2007, an opportunity arose for INENSUS to get involved in Senegal. During a business trip financed by the German Federal Ministry of Economics and Technology and organised by GIZ, they developed contacts with the Senegalese company Matforce, which was looking to expand its product range, previously limited...
to diesel generators, to include renewable energies. In 2008, INENSUS and Matforce set up the joint venture INENSUS West Africa S.A.R.L. Rural electrification was also top of the list of priorities of the GIZ programme to promote renewable energies and rural electrification, which has been implemented in Senegal since 2003 on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ).

So what better opportunity than to sign up to a development partnership and get on with the job. As a first step the partners wanted to demonstrate what was achievable in a model village. They started by taking wind measurements. Socioeconomic studies followed. Then the choice fell on Sine Moussa Abdou in the west of Senegal as the model village. Just 900 people live here, 70 families in all, with lighting provided by kerosene lamps and candles, a mill powered by an ancient diesel unit and a tailor who operated his sewing machine with a treadle.

By 2010, just three years after the launch of the partnership, the engineers were able to connect a mini power plant to the grid, with electricity generated from the wind, sun and – at peak times – a diesel generator. The operator was INENSUS West Africa; the business model bore the name MicroPowerEconomy. For Sine Moussa Abdou, it was the dawn of a new era: with his electric sewing machine, the tailor can now earn six times his previous income, the school has bought a computer, a group of women are planning to open a village shop with a refrigerator and it is hoped the village will soon see the arrival of the internet. Electricity supply to the remote village is reliable and much more secure than in the towns and cities, where power outages are an almost daily occurrence.

Connection to the rest of the world comes at a price, however, as the villagers are well aware. For as Nico Peterschmidt explains, MicroPowerEconomy is a profit-oriented business: ‘We developed this model and hope to see it become one of our main business segments. Our objective is to earn money in Senegal as an energy provider. The return rate for our investors is between 10 and 15%. What makes this possible is the economic development at village level that results from electrification.’ Although return on venture capital investment is low, it is still almost twice that of many European electricity providers.

SUCCESSFUL AND AWARD-WINNING

The international response to the community project implemented by INENSUS and GIZ has been overwhelming. In March 2011, it won the Innovation Prize for Climate and Environment in the Technology Transfer category, awarded by the German Federal Environment Ministry and the Federation of German Industries (BDI). INENSUS also received the SEED Award (SEED standing for ‘Supporting entrepreneurs for sustainable development’), which recognises the work of young entrepreneurs committed to environmental protection and sustainable development. The SEED initiative was launched in 2002 by several UN organisations and the International Union for Conservation of Nature (IUCN) at the World Summit on Sustainable Development in Johannesburg. So what is the secret ingredient that has made this idea a success? Certainly it is not the technology alone. The secret lies in the MicroPowerEconomy operating model. Many attempts to electrify the world’s poorer rural regions have failed – for a variety of reasons. Often it is because subsidy levels are high when the initial construction investment is made. Then, as the demand for energy rises the investors are no longer able to operate at the subsidised energy price. Other problems include irregular payment behaviour on the part of customers and energy theft. Based on such observations, Peterschmidt defines the basis on which the MicroPowerEconomy concept operates: ‘We break down the energy business to village level. That means we have to face our competitors at village level – the villagers have to want our model and organise themselves accordingly. The idea is to use this access to energy to generate growth in the village economy. So we also need to bring on board a microfinance organisation. We only invest under these conditions.’

The MicroPowerEconomy business model is persuasive. Forty per cent of total investment comes from international donors, in this case the BMZ-financed Programme to Promote Renewable Energies and Rural Electrification. This funding enables INENSUS to finance fixed grid components such as buildings, electricity pylons and cables. Ownership of these is transferred to the village community. The remaining 60% is paid by an investor, INENSUS in the case of Sine Moussa Abdou, who owns the movable components such as solar panels, wind turbines and batteries. Before any such project gets off the ground, the villagers form a village energy committee. ‘We meet with the villagers on equal terms,’ says Peterschmidt. INENSUS negotiates with the energy committee and provides one villager with the electrical training necessary to keep the grid running. The negotiations also result in a contract between the village committee and INENSUS, stipulating the price of electricity and volume of energy to be supplied. Contracts run for a period of six months. Thereafter the villagers can either renegotiate the contract or choose a different operator.
One of the keys to the model’s success is the degree of planning security for both operator and energy consumers. Both partners know how much electricity is required over a six-month period, who the customer is and who is paying. Each family commits to how much energy they require per week and buys the requisite amount of credit on a prepaid card. Should they require additional electricity for a special occasion, for example, this can be bought in the form of ‘extra energy’. As this comes from a diesel generator rather than renewable sources, it is more expensive. The engineers from Goslar have even dealt with the problem of electricity theft in Sine Moussa Abdou, where installations are equipped with the company’s so-called smart meter. Each of these boxes, the size of two handspans, checks the prepaid cards of three households, is securely sealed and has a transparent lid. Anyone trying to defraud the system merely steals his neighbours’ electricity, which is detected immediately.

MARKET-DRIVEN AND SUSTAINABLE

The business model is attracting increasing support. The three entrepreneurs have been promised public funding from the Dutch Daez Ouwens Fund to electrify 30 more villages with a total population of 30,000. The three will also take out an additional loan from the Dutch development bank in order to finance the private investment – the movable components of the micro power plants. And the idea is increasingly attracting the interest of private investors as well as international donors. Peterschmidt is confident: ‘We have to offer our complete package at a competitive price and sell it in large numbers. We keep the margins low because we know our profits have to be paid by the villagers. Nevertheless, our model is commercial, market-driven and for that reason sustainable.’

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IN THE SPOTLIGHT

SENEGAL

> COUNTRY STATISTICS
Area in km²: 196,712
Capital: Dakar
Population growth: 2.6% per annum
GDP 2010: EUR 9.6 billion
Per capita income 2010: EUR 790

AT A GLANCE
• Programme to Promote Renewable Energies and Rural Electrification
• Commissioned by: German Federal Ministry for Economic Cooperation and Development (BMZ)
• Partner: Senegal Ministry of Energy
• Overall term: 2004 to 2016

The programme supports the Senegalese Government and local businesses with the rural electrification of 265 remote villages with a total population of 90,000. Electricity is generated primarily from solar energy with back-up provided by a diesel generator. For this the programme also receives funding from the Directorate-General for International Cooperation (DGIS) at the Dutch Ministry of Foreign Affairs. The only village communities given consideration as project partners are those that have shown themselves capable of self-organisation and that have at least one public institution such as a school or health centre. Villages range in size from 100 to 700 inhabitants and are situated at considerable distance from the medium voltage grid.

The government grants Senegalese companies a concession under the terms of which they make a commitment to supply a village with electricity for a period of 15 years. In return, they are permitted to levy a charge determined by the Senegalese regulatory authority.

INENSUS West Africa was awarded the concession, built the micro wind-hybrid power plant in Sine Moussa Abdou as part of a development partnership with the German energy programme and put in place a micro power business model.

Another priority area of the programme is the sustainable supply of domestic fuel to counter increasing deforestation. The programme also provides advisory services to the Senegalese Government on energy issues such as the feed-in tariff regulation for renewable energies.

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