



Photo: C. Kropke

## Electrifying Senegal – renewably!

Senegal, in West Africa, is aiming high. It plans to electrify all of its rural areas over the next decade. Solar, wind and biomass generation will play a major role in achieving this aim.

Senegal's electricity grid is overloaded, and there are regular blackouts. This is no surprise, since demand for electricity is growing by 40 megawatts a year. The state supply company Senelec struggles to meet this rising demand by building new power plants. At present, there are plans to build a coal-fired power plant, rumoured to be a Chinese project.

Quite aside from the issue of blackouts, many rural areas have yet to be connected to the electricity grid in the first place. According to Mr Mansour A. Dahouenon, an expert from Deutsche Gesellschaft für Technische

Zusammenarbeit (GTZ) who is based in the Senegalese capital, Dakar, only 22 percent of the rural population are connected to the public grid.

One small village in Casamance, southern Senegal, is lucky. Baïla has a population of 2,000, lies on main road number 5 and is on-grid. Yet power cuts are still an everyday occurrence. When they happen, the lights go out, radios go dead, water pumps lie idle and mobile phones cannot be charged. The village has a clinic, to which people travel from miles around for treatment. Long power cuts used to pose a particular problem for the medical and nursing staff, as the clinic's refrigeration units would be out of action. Vital medication and life-saving units of blood could not be kept cool enough and were ruined as a result. Sudden power cuts at night were particularly

difficult when the maternity ward was assisting with a difficult delivery.

However, since May 2008 such emergencies have been a thing of the past: a five-kilowatt solar photovoltaic module on the roof of the clinic feeds batteries, which then provide backup power during blackouts. Thus the stored solar energy replaces a standby generator, as well as feeding electricity into the grid when it is running. This unusual project began with Kaïto Energie AG, a German company which invests in modern infrastructure for rural electrification. Kaïto mainly helps local stakeholders in various African countries to develop rural power plants based on renewable sources. The company is not merely aiming to do good in the short term; instead, it wants to drive long-term, economically sustainable development.

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### Dierk Jensen

Freelance journalist  
Hamburg, Germany  
Dierk.jensen@gmx.de

◀ A five-kilowatt solar photovoltaic module on the roof of the clinic in Baïla prevents power-cuts and thus keep the technical facilities working.

## ■ Agriculture, water and energy go together

Mr Abasse Goudiaby grows millet a towering three metres high. He works a smallholding comprising 1.5 hectares of arable land and ten cattle, including seven cows. Goudiaby himself looms large in the local community: he acts as on-site manager for the solar power plant, sharing responsibility with Kaito. Goudiaby is originally from the Baïla area, but emigrated to France as a young man because he saw no prospects in Casamance. He only returned home a few years ago. For Goudiaby, the photovoltaic system is just a stepping stone towards an overhaul of the village infrastructure. He understands

that agriculture, water and energy are closely interlinked. Goudiaby wants to end the village grazing system which currently sees cows and goats moving unchecked through the land, eating anything and everything green. In future, the cows will be enclosed; behind his house, Goudiaby demonstrates how. He has planted hedges of *Jatropha* bushes, which could be used to produce oil in the not-too-distant future and thus fuel a heating plant or a tractor for the village. "That is still a long way off. First we need suitable seedlings, then we'll need a communal nursery, for which we will need water – we don't have enough of that at the moment", notes Goudiaby.

## ■ Solar-powered medicine refrigeration

The clinic at Baïla is about 200 metres from Goudiaby's smallholding. Rice, grown on the flood plains of the

river and freshly harvested by hand, is spread out on the ground to dry in a number of courtyards. An ambulance stands in front of the clinic to take patients to hospital in the region's capital, Ziguinchor, if they have a heart attack, serious accident, bad case of malaria or difficulties in childbirth. "It is rarely needed now" says the senior nurse Mr Pape Assane Coly. "Since we've had the solar panels, I can count on all the major medicines being refrigerated and ready at all times. I am constantly using the malaria drugs."

Rural electrification is one of the current Senegalese government's major development policy goals, timetabled for the next ten years. In his New Year address, Senegal's President Wade stated that this was one of the country's most important challenges. Mr Mod-

*The farmer Abasse Goudiaby keeps an eye on the solar plant at the clinic.*



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*This young mother can be happy, as thanks to the solar plant the electricity in the maternity ward now works without a blackout.*

biogas, small wind turbines are already under discussion.

Mr Diop, the head of ASER, points out that even now, electricity from solar power is cheaper than electricity from oil-based sources in Senegal. He cites the 100 or so PV systems with an output of over a kilowatt, and a further 10,000 solar home systems, mainly installed as part of European development cooperation efforts in Senegal in recent years. These mini solar plants in particular, with an output of a couple of hundred watts, are used to power radios, televisions or mobile phone charging stations.

Mobiles are gaining in popularity in Senegal and across Africa as a whole. Mobile phone operators are flourishing, and erecting masts all over the country. This means paradoxically that a goat herder in the remote bush may well brandish a mobile phone, despite the fact that many areas lack sufficient water for agriculture and many villages have no grid connection. This is an Africa-wide revolution, and of course Baila is part of it. Sometimes, if there's a technical issue with the solar plant, the farmer Goudiaby reaches for his mobile and calls the panels' manufacturer Schott Solar in Germany to discuss the issue. Sometimes this can even solve the problem!

ibo Diop, head of the Senegalese Rural Electrification Agency (Agence Sénégalaise d'Électrification Rurale, ASER) based in the capital, Dakar, explains: "We have undertaken to connect half the rural population of Senegal to the grid by 2012, that is around seven million people". If Diop has his way, electric light will shine on even the

remotest village in Senegal by 2017 at the latest.

Yet not every village is prepared to wait that long. Investment is already being made in island networks, powered by either diesel or solar generators. Although there is no question as yet of distributed generation from

## Zusammenfassung

Große Teile der ländlichen Bevölkerung Senegals haben immer noch keinen Zugang zu Elektrizität. Häufig ist dies auch ein Hindernis für die kommunale Entwicklung („community development“). Die senegalesische Regierung hat sich daher ein ehrgeiziges Ziel gesetzt: Bis 2017 soll jedes Dorf mit Elektrizität versorgt sein. Solarenergie spielt in diesen Elektrifizierungsplänen eine wichtige Rolle. Senegalesische Experten sind sich sicher, dass Energie bereits heute in vielen Bereichen

billiger aus Sonnenkraft als aus Mineralöl gewonnen werden kann. Das Beispiel von Baila im Süden Senegals zeigt, welche positive Kraft innerhalb einer dörflichen Infrastruktur durch den Betrieb von Solaranlagen freigesetzt werden kann.

## Resumen

Gran parte de la población rural de Senegal todavía no tiene acceso a la electricidad. En muchos casos, esto se convierte en un obstáculo para el desarrollo comunitario. Por lo tanto, el gobierno senegalés se

ha fijado el ambicioso objetivo de electrificar todas y cada una de las aldeas del país para 2017. La energía solar juega un rol clave en esta estrategia de electrificación. Los expertos senegaleses sostienen que en muchas áreas la energía ya puede generarse de manera más económica a partir de la radiación solar que a partir de fuentes basadas en petróleo. Los ejemplos de Baila, en el sur de Senegal, reflejan el impulso positivo que puede darse a la infraestructura de una aldea a partir de la operación de plantas de energía solar.