

Project Description

Emergency Power Supply for a Clinic

The Challenge:

Senegal's economy is currently growing more rapidly than that of its neighbouring countries in West Africa, a fact that is also reflected in its energy consumption. Only one in three of approximately 12 million Senegalese is supplied with electricity via the public power network today. In rural areas, less than 20% of the population has access to electricity. Many projects, which are supported by the World Bank among others, are already devoting their efforts towards solving this problem. Nevertheless, this West African country is still dependent on the help of private investors. Rural areas of Senegal in particular lack widespread access to a power supply – but what they do have is lots of sun. This is the ideal prerequisite for the installation of photovoltaic systems to provide direct access to electricity or to maintain decentralized access to the power supply as stand-alone systems.

The Need for Action:

It's a simple equation: Electric power is the basic prerequisite for the formation of any type of economic structure. Without electricity, it is very difficult to create added value anywhere to allow new local companies to grow. Sustainable development like this requires infrastructure that functions properly. And the energy supply plays a key role not only in the economy, but in virtually every area of day-to-day life – regardless of whether in private households, schools, the skilled trades or hospitals: a



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stable supply of energy is essential, particularly for the medical facilities so important to the Senegalese people. This, however, cannot be guaranteed everywhere in the country. The local electricity network sometimes cuts off its service several times a day, which means that it is impossible to keep medication as cool as it should be. The lights go out and medical equipment ceases to work. As a result, doctors and nurses are often unable to treat their patients as the situation requires.

These are the problems that the staff and patients in a clinic and labour ward had been struggling with in Baïla, a village in the province of Casamance in southern Senegal. With one outpatients' clinic, one labour ward, ten beds, a pharmacy and accommodation for family members, the doctor and the nurses give their all, day in, day out, to ease minor and more serious ailments. The clinic in Baïla provides medical care for people living within a radius of many kilometres. Up to now, the staff has had to make do with the simplest of means in the event of a power outage: petroleum lamps and candles provided light until the electricity went back on again. If there was any diesel available, the clinic was sometimes able to tide itself over with a power generator. Since just recently however, the staff and patients in Baïla no longer have to worry, because an emergency solar power system, supplied and installed by three German companies, ensures constant power supply.

The Solution:

Since May 2008, a modular SCHOTT Solar power system has guaranteed constant power supply to the clinic in Baïla. In conjunction with project partners KAÏTO Energie AG and SMA

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Solar Technology AG, this project is the first of its kind in Senegal to successfully supply emergency solar power to a clinic.

The way in which a solar power station works is simple, yet highly effective: Mounted on the roof of the clinic, the solar modules collect the sun's rays and convert this energy into electricity. The power from the solar modules supplies the consumers during the day; the surplus energy is stored in batteries. The photovoltaic system delivers a power output of five kilowatts (kW), producing 8,000 kilowatts hours of electricity annually. A so-called Sunny back-up system from SMA is a valuable addition to the SCHOTT Solar system. In the event of a power failure, the back-up system can automatically switch to the stand-alone supply within 20 milliseconds to keep the clinic up and running even when it is off the grid.

Because the ambient conditions in Casamance are extreme, the system in Baïla is equipped with special double-glazed modules, which have often stood the test of use under such conditions in the past. SCHOTT Solar has made it a rule to test all its modules under extreme temperature fluctuations, long-term humidity and high pressure and suction. SCHOTT Solar believes it is the only manufacturer to apply standards that are twice as stringent as solar module testing criteria stipulate. The power inverter also plays an important role in the cost efficiency and performance of a solar system. It converts direct current from the solar modules into the alternating current required. SCHOTT Solar management deliberately opted for the SMA

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system technology because it is also very well equipped to handle the extreme weather conditions in Senegal.

In selecting the project, SCHOTT Solar followed the recommendation of KAÏTO Energie AG. KAÏTO has already been successfully implementing projects designed to boost the economy in Casamance for six years, whereby the company places a special focus on decentralized power supplies on the basis of renewable energies. In Casamance, KAÏTO was also instrumental in setting up a fish farm in 2004 and an apiary in 2006. Thanks to the experience gained and the direct contacts established by the company, the emergency power supply for a clinic project has also become a resounding success.

The people in Baïla were also directly involved in constructing the solar system: the village community built the extension on which employees from SCHOTT Solar and KAÏTO mounted the system together in May. Trainees from the neighbouring vocational school supported the experts from Germany and installed the modules on the roof. In doing so, they were able to put the theory they had learned directly into practice and to try their hands at working with modern technology. SCHOTT Solar took over the electrical installation, the technical approval of the back-up system and trained the electrician locally who will now independently service the system and receive on-site assistance from KAÏTO on a regular basis.

Thanks to the extensive participation of the villagers, the people in Baïla do not perceive the solar power station as a gift given to them from an outside source. On the contrary, they consider it a project that they have implemented themselves, with support

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and assistance from the outside. Almost 2000 people in Baïla and the villages in the surrounding area can now confidently rely on the power supply in the clinic. The project managers hope that the example of emergency power supply in Baïla will set a precedent. After all, electricity is in short supply in other villages in Senegal as well. In contrast to Baïla, many are not even connected to the public power grid because the cross-country network runs along major roads only. In rural regions in particular, there are long distances to cover before all the villages in the bush can be reached. This makes the connections too expensive and, from a business point of view for the energy provider, the installation costs are in no relation to what the rural households would be able to pay. The virtually inexhaustible potential of the sun, on the other hand, comes for free in Senegal – it just has to be harnessed properly. That's the advantage of renewable energies: they can be used anywhere that conventional power supply over land is unable to reach, or where the power supply is not reliable enough.

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Future Outlook:

KAÏTO will continue to work towards a decentralized power supply in Senegal and position itself as the energy provider in rural Africa. In July, a subsidiary was created to carry out the project. The electrification concept has already been developed and the first projects are underway. Among other things, plans have been made to build a chain of village energy kiosks to be operated by local small businessmen in a franchise system. Each kiosk will be equipped with a central PV recharging station for such battery-operated devices as lamps and cell phones. The operators will provide information on energy efficiency and supplementary solutions, sell PV consumer goods, spare parts and energy-saving appliances and offer simple installation services.



About the Project Partners:

SCHOTT Solar, SMA and KAÏTO are active members of the Rural Electrification Project Group in the German Solar Industry Association. The idea of installing a solar power station in Senegal was first born during a business trip to Senegal. This trip took place in May 2007 and was part of the scheme for “Project Development in Senegal – Renewable Energies and Rural Electrification”, initiated by the German Ministry of Economics and Technology (BMWi). German companies were given the opportunity to establish contacts to Senegalese partners and institutions. In addition to establishing contacts, there was also a

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special focus placed on developing initial business ideas.

The solar power system for the clinic in Baïla shows that this goal was achieved after just one year.

SCHOTT Solar AG

SCHOTT Solar's high quality products exploit the virtually inexhaustible potential of the sun as a renewable source of energy. For this purpose SCHOTT Solar produces important components for photovoltaic applications and solar energy plants with parabolic trough technology. In the photovoltaic industry, the company is one of the few integrated manufacturers of crystalline silicon wafers, solar cells and photovoltaic modules. Wafer production is mainly carried out through a WACKER SCHOTT Solar joint venture, which ensures the supply of silicon necessary for long-term growth. Thanks to over 20 years of experience in thin-film technology, SCHOTT Solar also regards itself as one of the industry's cutting-edge companies. In receiver production for solar power plants with parabolic trough technology, SCHOTT Solar considers itself to be the market and technology leader. The receivers are key components in large-scale power plants that generate electricity from solar energy centrally on the basis of parabolic trough technology and can supply entire cities with power. SCHOTT Solar has production facilities in Germany, the Czech Republic, the USA and Spain. SCHOTT Solar's innovative power and technological expertise date back to the late 1950s. SCHOTT Solar AG is a wholly owned subsidiary of the international SCHOTT technology group. SCHOTT develops special materials, components and systems for the household appliance, pharmaceutical, solar energy, electronics, optical and automotive industries. With around 16,700 employees, the SCHOTT Group generated a worldwide turnover of about 2.1 billion euros in fiscal year 2006/2007.

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SMA Solar Technology AG

With sales amounting to €327m (2007), SMA is the world's market leader in photovoltaic inverters, a central component in every solar power system. The SMA Group has its head offices in Niestetal near Kassel, Germany, and is represented by foreign subsidiaries in eight countries on four continents around the world. The corporate group employs more than 2,500 people (incl. temporary employees). SMA produces a wide range of inverter models for every type of photovoltaic module used and all sizes of photovoltaic systems. The product portfolio includes inverters for on-grid solar power installations as well as for stand-alone systems.



KAÏTO

KAÏTO Energie AG invests in modern infrastructure for rural electrification. Different types of power generators drawing on renewable energies were developed in villages to provide power on a widespread scale. Based on solar-powered energy kiosks and individual installations, regional networks (AC mini grids) are created that gain their energy from local sources like the sun and biomass. KAÏTO operates all the systems independently with a local workforce.

KAÏTO Projekt GmbH specialises in sustainable investments in West Africa. KAÏTO offers customised project development and investment consultancy services to companies that are investing in Africa themselves, or would like to become involved in actual projects. All projects foster rural development and comply with sustainability criteria.

KAÏTO has had its own subsidiary in Senegal since July 2008.

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