Osvaldo Nogueira, who works for power suppliers Electra, is responsible for the operation of the stand-alone photovoltaic plant close to the capital of Praia, on the island of Santiago.
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Renewable Energy

15.10.2012

A model for entire West Africa

The island state of Cape Verde has set itself ambitious goals. By 2020, half of the islands' energy is to come from renewable sources. Even though the development of the power grids still leaves much to be desired and the financiers now and then forget that operating a high-tech plant also requires the necessary knowhow, this 500,000-inhabitant country is determined to herald the start of a new energy era in West Africa.

He has often crawled through the hatch. Mahama Kappiah agilely climbs up the small hatch leading through the narrow exit to the flat roof on the house accommodating West Africa's Secretariat of the Regional Centre for Renewable Energy and Energy Efficiency (ECREEE). Kappiah, who is Executive Director of ECREEE, enjoys showing his visitors – whether from West Africa or from other parts of the world – the photovoltaic plant mounted on the roof. After all, it demonstrates that the agency is not merely preaching renewable energies but setting a good example itself. Two stories down, in front of the entrance to the ECREEE centre, a large display board shows how much CO2 the roof plant is saving. However, the amount of CO2 that the diesel generator in front of the entrance is blowing into the air of Praia, the capital of Cape Verde, on the island of Santiago, each hour remains a secret.

Instead of hydropower and biomass ...

"The Cape Verde islands are a good location for renewable energy," says Kappiah, who is satisfied with the location that the Economic Community of West African States (ECOWAS) has chosen for its agency, founded in 2010. Kappiah is not only saying this to be diplomatically polite. For hardly any other West African country is doing as much to promote the shift to renewable as Cape Verde is with its current policies. By 2020, the islanders hope to be generating half of their electricity with renewables. This goal represents a considerable challenge for the authorities of the islands situated more than 600 kilometres to the west of continental Africa. For they have to achieve their goal without hydropower – there are no major rivers – and biomass. There is simply too little rainfall for the latter, and overexploitation of forests in colonial days took its toll. The soils are sandy, volcanic, stony and barren, and intensive farming is only possible in a few places. This is why any energy plant production for biogas plants or biomass power stations is ruled out, although,

interestingly, there is a research station and a trial field planted with Jatropha in the centre of Santiago.

Wind and sun en masse

But instead of biomass and hydropower, the Cape Verde islands have plenty of wind and sun to offer. A five-megawatt photovoltaic standalone plant set up with Portuguese loans in a desert-like area close to the capital shows that the Cape Verdeans really mean business with their ambitions. In addition, a wind park with twelve wind turbines à 850 kW output was built on a hill ridge that can easily be spotted from the city centre of Praia if visibility is good. However, sometimes the plants of Danish manufacturers Vestas are standing still because the wind, coming from the Atlantic across the stony island of Santiago, which is only fertile in some of the valleys, is blowing too strongly.

Then the load on the grid will once again be too great. "We can only feed 25 per cent of the renewable energies into the existing grid," explains electrical engineer and ECREEE staff member Jansénio Delgado at the wind park, which also has a wind turbine built by the firm Nordtank, and which was the first to be linked to the grid, in the nineties. "More is not feasible technically at the moment, and everything exceeding that is a real problem," says Delgado. "This is why the new wind park is always switched off now and then. If a new pumped storage hydropower station isn't built here soon, the 50 per cent goal won't materialise," Delgado complains. Just how important grid extension or the construction of pump storage stations is was revealed on Christmas Eve 2011, when there were blackouts after the handing out of presents. Everywhere in the capital, the emergency diesel generators started, and thick plumes of diesel exhaust rose.

A lack of knowhow and money

Forty-seven-year-old Delgado, who was born in the Cape Verdes, is well aware of the grid problems. He used to work for the government-owned energy supplier Electra for a couple of years. In addition, he founded the firm Electric Wind in the 1990s, which since entered a joint venture with a Dutch company and linked two 250-kW wind turbines of former Danish manufacturers to the grid on the island of Santoo Antão. In order to put this into practice, Electric Wind had to lay a seven-kilometre 10-kilovolt grid cable at its own expense. "Once the grid in Santo Antão has become more stable, we want to link further plants to it at two more locations with wind speeds of nine to ten metres a second," Delgado explains, looking ahead.
As a wind energy pioneer, he explicitly welcomes the Cabeolica wind park project, which comprises a further eight megawatts on the island of Sal and another four respectively on the islands of Boa Vista and São Vicente, in addition to the twelve Vestas wind turbines in Santiago. He regards Cabeolica as an "important signal in the right direction and a lighthouse project for entire West Africa," the ECREEE expert stresses. At the same time, however, he criticises that the actors and firms involved are providing too little transfer of knowhow. "Simply setting up the plants and leaving it to inexperienced technicians in an underdeveloped country to operate them is far from doing enough," he complains.

"Opened on the 15th April 2010," it says on a small plaque fixed to a paled gate. Osvaldo Nogueira smiles. "Of course this is a huge challenge for us energy suppliers," says the mechanical engineer responsible for the operation of the plant. "We generate around 20,000 kilowatt hours a day, which on average covers about ten per cent of Praia's demand," says the 32-year-old. But Nogueira, who studied in Coimbra, in Portugal, also complains that while

solar power can be fed into the grid at a relatively constant level, wind power is unpredictable. “In order to cope with this, a 60-kV line is to be built across the entire island.” Referring to the biggest problem, he adds that “we are a poor country, and therefore, with our investments in renewable energies, we are already approaching the limits of our resources”.

Tourism raising power demand

Meanwhile, power demand on all of the Cape Verde islands is steadily increasing. This is also due to the growth of tourism. According to the latest statistics, the number of holidaymakers once again rose by 20 percent last year. In order to be able to cover the power demand, Electra are currently building a 20-megawatt diesel cogeneration plant just a stone’s throw from the PV standalone plant.

The simultaneous development of diesel generator sets and renewable energies is also being pursued on the sandy island of Sal in the north of the archipelago. Here, tourism is on the advance like on no other Cape Verdean island. Europeans in particular are delighted with the long beaches and the mighty surf. And they are welcome. After all, they are bringing along money and employment to the island, where salt was mined in Portuguese colonial times. Just a few kilometres south of the salt-works, which were closed down ages ago, ten Vestas turbines have been turning since the end of last year. Together with a 2.5-megawatt PV plant near the coastal resort of Santa Maria, they are heralding a new era of energy supply there.

Making mention of salt, there is enough salty water around Sal, while drinking water is a precious good, and even scarcer than energy. Each cubic metre on the island costs 11.5 Euro, compared to a kilowatt hour of electricity being available at around 28 cent. Three desalination plants operate to produce water for locals and for holiday guests. “Over the last few weeks, we have had water supply bottlenecks here because power suppliers Electra are claimed not to have paid the invoices sent by their diesel suppliers and the diesel engines were therefore not operating at the local water providers, Aquas Ponta Preta,” says the German Tanja Hausmann, who has been living on the island for some years and heads the office of tour operators vista verde tours.

It is noteworthy that large new buildings erected by Spanish hotel chains have so far installed neither solar thermal equipment nor photovoltaic plants. So far, only a handful of hoteliers have been using the power of the sun. One of them is Francisco Lopes. With his 35,000 Euro solar thermal plant on the roof of his 25-bed hotel in the seaside resort of Santa Maria, he can cover his hot water demand on sunny days, which saves him expensive electricity that he would have to pay for to use his continuous-flow water heater. At the same time, he is taking the strain off the grid, which is under particular pressure in the evening, after a long day on the beach, with the tourists all taking a shower collectively.

A glance at the neighbours

In spite of all the grid problems as well as small and larger conflicting issues, what is West Africa’s smallest country, with its mere half a million inhabitants, is boldly making progress within the ECOWAS community in terms of renewable energies. In contrast, wind, sun, water and biomass are incomparably more difficult to establish as energy sources in countries such as Ghana, Benin and Togo. “Given consumer prices of 4.5 Cent per kilowatt hour, only little is happening there at the moment,” ECREEE’s Kappiah remarks. However, things look entirely different in Mali and in Niger, where, as he reports, much is underway in the decentralised generating business.

There can be no mention of this in Niger's giant neighbour, Nigeria, with its 150 million inhabitants. This country is a very difficult place for the renewables, and not only because of the ruthless pursuit of the black gold by the major corporations causing the degradation of large habitats but also because the political class has been consumed by corruption. In this system of paid dependencies, it is almost impossible for newcomers to the energy business to establish themselves. Moreover, the government-run utilities have so far made hardly any effort to promote power generating using renewable sources because they are not interested in any long-term perspectives. "All that prevails in Nigeria is thinking in cash terms," Kappiah notes, reporting on resistance that also exists in other member states. For the ECREEE director, there can therefore be no doubt that establishing renewable energies in West Africa has to go hand in hand with socio-political changes.

The villages mustn't be forgotten

This is why, in addition to investing in major power station units, whether large wind parks, ethanol factories initiated by the Brazilians, hydropower plants or solar parks that Europeans seek to establish in the desert, ECREEE is also always concentrating on the small projects in the country, far away from the major towns and grids. The entire village community can benefit from a sustainable power supply. Light is provided for the hospitals and schools, and refrigerators can cool medicine and easily perishable vegetables. "This is an important joint task that stems migration to the towns," says Kappiah, noting that an awareness of the need for such investments is definitely greater in countries with a socialist past. "If a country has no tradition of social policy approaches, then there will, as a rule, also be little in the way of opportunities for decentralised, renewable energies," the mechanical engineer claims.

But it is not only the frequent absence of social policy considerations and the drifting apart of energy policies in the individual member countries that causes the ECREEE director to frown. Confrontation between Muslim and Christian sections of the population in many West African countries is complicating lobbying activities towards the first steps to transform the energy industry.
Optimism nevertheless prevails.
ECOWAS intends to swiftly develop the agency. The team of staff are to increase, and the annual budget has been doubled to a current seven million Euros in order to be able to campaign for renewable energy projects in West Africa, too. "In many countries, the aim has to be to generate a ten to 25 per cent share of renewable energy," Kappiah postulates. Energy efficiency is a huge topic in parallel to the development of renewable energies. Over the next few years, it is planned to save up to 30 per cent of energy. This is a mammoth task that the ECREEE staff are to provide impulses for from their base in Cape Verde. Regardless of how fast success can be scored, ECREEE stands for the long overdue beginning of a new energy era in West Africa and the whole of sub-Saharan Africa.

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Quelle: http://www.rural21.com/english/a-closer-look-at/detail/article/a-model-for-entire-west-africa-0000478/